Proceedings of the Institute of Acoustics & Belqium Acoustical Society
Noise in the Built Environment, Ghent, 29-30 April 2010

QUIET AREAS AND THE NEED FOR QUIETNESS IN AMSTERDAM

ir. Hester Booi Department for research and statistics (O+S), municipality of Amsterdam
dr.ir. Frits van den Berg Public health services (GGD), municipality of Amsterdam
dr. Willem Bosveld Department for research and statistics (O+S), municipality of Amsterdam

1 ABSTRACT

As part of a project on possible policies for quiet areas in cities, a survey was held amongst citizens of Amsterdam. The purpose of the survey was to find out: 1) which (public) quiet places there are, according to Amsterdam residents; 2) what characterizes a 'quiet place'; 3) to what extent do residents want peace and quiet; 4) how do residents realize these needs. This paper focuses on the need for peace and quiet. It presents a model of the determining factors for the need for quiet. This model shows the influence of demographic and socio-economic factors, health-status, sensitiveness to noise, daily-life activities and the noisiness at home and in the surrounding area.
The most important determining factor is sensitiveness to noise. Elderly and less healthy people are more often sensitive to noise, though age and health have their own separate influence on the need for quiet. When people have nuisance of traffic, airplanes and the like their need for quiet increases. People with a busy household or neighbourhood report lower needs for quiet. Visiting a quiet place and going outside to walk or bike can have a compensating effect on the need for quiet. This suggests that creating quiet places and enhancing possibilities to recreate in urban environments can have a positive effect on the quality of life in the city.

2 THE NEED FOR QUIET IN THE URBAN ENVIRONMENT

Cities are the living environments of the future. Half of the world population now lives in urban areas.[1] And while the population in western European countries will shrink, the population in cities still increases.[2] Amsterdam is an example: it is a popular place to live, its population size grows annually.[3] The liveliness of the city is an important factor in this popularity. The qualities of the city are for example the availability of shops, theatre, restaurants and services. Qualities that give life in the city streets.
Quietness is not the first thing that comes to mind in the context of the urban environment. However sound is an inseparable part of the living environment and the liveability of the city. In the last decade in Amsterdam a lot of attention has been paid to the liveability of the city. For example through the management of public space, increasing safety on the streets and urban renewal programs. The results of these actions are monitored through different questionnaires on residents' satisfaction. This monitoring and research on the liveability of the city do give attention to nuisance, but not to its counter part: quietness and tranquillity. To make the city a good place to live, quietness and tranquillity could be just as important.
The existing research on quiet areas and the need for quiet focuses mainly on rural areas and natural sites.[4] The research on this topic in urban settings mostly focuses on noise[5] and not on the reciprocal: quietness. In this paper the focus is on the need for quiet in the urban environment.

The few studies on the need for quiet have shown that quietness is indeed important. In a Dutch survey on the need for space, quietness and silence in recreation areas 80% of the respondents report that these aspects are (very) important. On this aspect no differences were found between people living in urban and rural areas or other background variables like age or gender.[6] In a survey

held amongst visitors of natural areas similar results were found.[7] In this survey the respondents were also asked about their sensitivity to noise. Though almost half of the respondents said they were (highly) sensitive to noise, this aspect did not seem to have any influence on the need for quietness. Both researches were done amongst people who visited natural areas or had a focus on quietness in natural areas. In this setting the need for quiet seems to be quite universal.
But elsewhere green and nature seem to be important aspects in quietness. The preference of soundscapes is clearly linked to a preference of natural elements.[8] The quiet places that people mentioned in the Amsterdam survey were predominantly green or natural areas.[9]

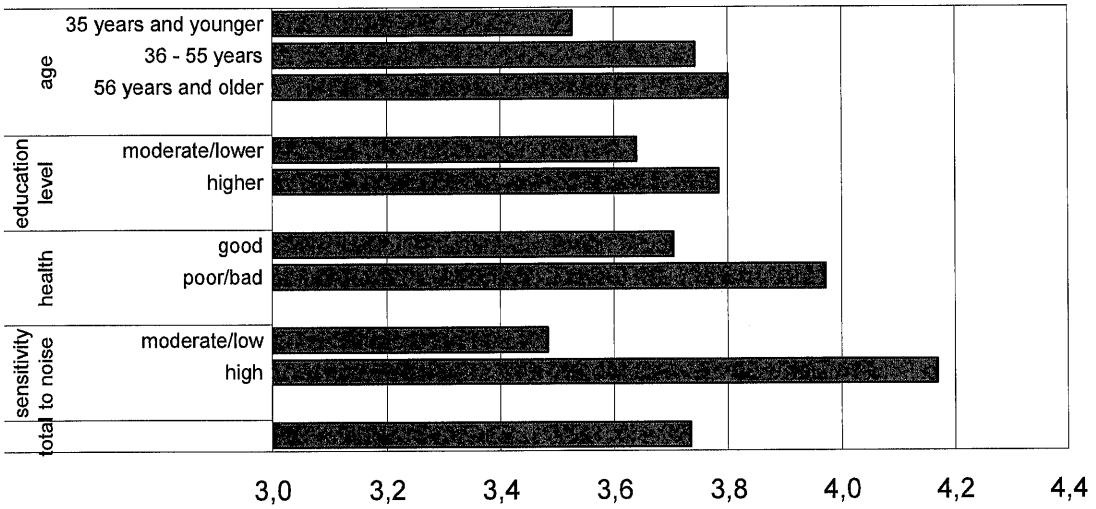
3 QUIET AREAS SURVEY AMSTERDAM

In this paper we will give an insight in the need for quiet in an urban environment. First an overview of the relevant characteristics is given. This includes both individual background variables, perceptions of sounds in the neighbourhood and participation in relaxing activities. After that, all these characteristics are put in one regression analysis. In this analysis we can see how these variables interact with each other.
For this analysis we used the results of a survey held in 2008 among the citizens of Amsterdam on quiet areas and the need for quiet. For the analysis in this article only fully completed questionnaires were used. A total of 809 respondents were included.
The mean age of the respondents was 51 years old (st.dev. 13,9; range 15-89). More than half of the respondents were female (58%). Two third of the respondents had a higher education level. The majority had paid work (80%). Compared with whole population of Amsterdam older people, females, higher educated and working people are slightly overrepresented. A quarter of the respondents lived in a household with children. Eleven percent had problems with their health. This is comparable with the total population.

In the survey respondents were asked how important quietness is for them in and around the home, in the neighbourhood and in the city in general. Most people like to have a quiet home (73%), half of the residents prefer a quiet neighbourhood (49%) and 21% prefer a quiet city. To make a scale on the need for quiet the reliability is checked with Cronbach's α. Cronbach's α for these three variables is 0.635. People who prefer quietness at home tend to prefer quietness in the neighbourhood. The correlation with the preference for quietness in the city is lower (Cronbach's α if item deleted is 0.711). Therefore only the variables 'preference for quietness at home' and 'preference for quietness in the neighbourhood' were used to make a scale. The scale varies from 1 till 5 (mean 3,7; st.dev. 0,89). This scale is used to analyse the need for quiet in the urban environment.

People with bad health and older people have a higher need for quiet. But also people with higher education report higher needs for quiet. The sensitivity to noise is the most important factor in the need for quiet (see figure 1). The need for quiet differs from 3,5 for the people who are not sensitive to noise at all to 4,2 for the people who are very sensitive to noise.

Figure 1 Need for quiet (mean) for different individual characteristics 1)

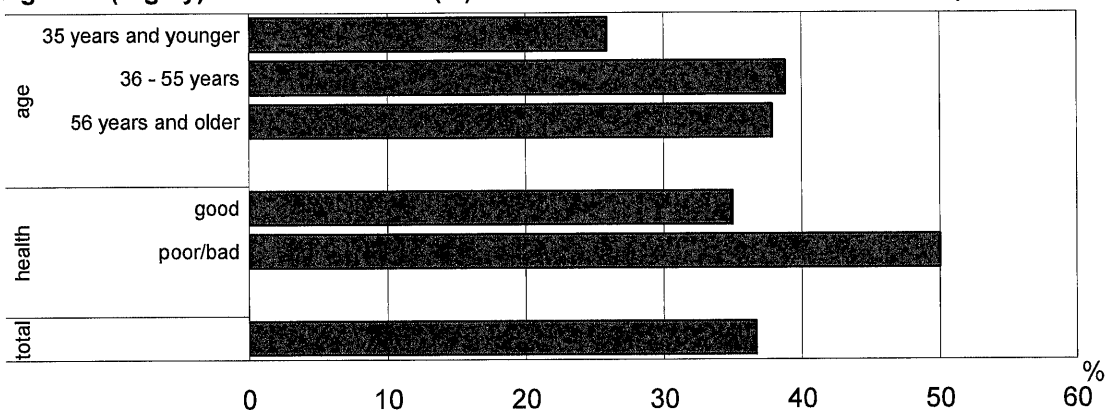


1) t-test, all differences mentioned are significant at $p < 0.05$

More then one third of the respondents (37%) said that they were sensitive to noise. This is less then with visitors of natural areas.[10] This could indicate that people who are sensitive to noise, more often visit natural areas. Eleven percent of the respondents report that they are highly sensitive to noise. This is comparable with results in other surveys (results varying between 12%-15%[11]).

Sensitivity to noise is more common for middle-aged and older people then it is for younger people and it is more common for people with bad health (see figure 2). Other individual characteristics did not have a (significant) influence on noise sensitivity.

Figure 2 (Highly) sensitive to noise (%) for different individual characteristics 1)



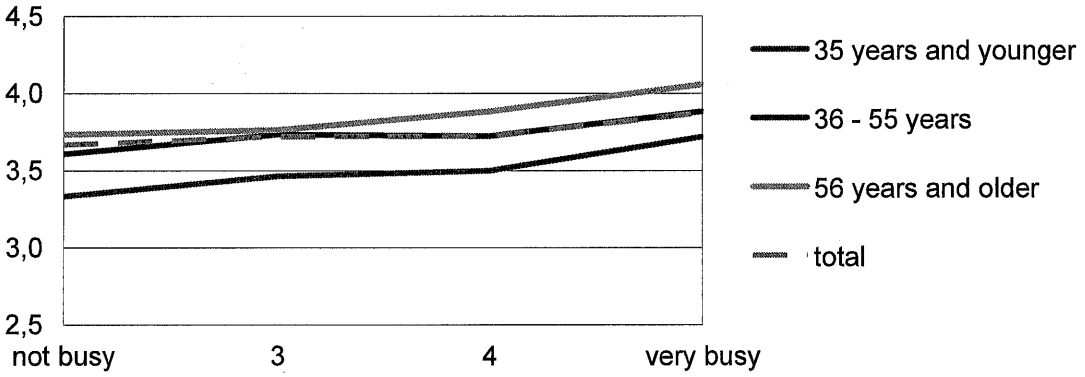
1) z-test, all differences mentioned are significant at $p < 0.05$

When people have a busy life, the need for quietness could increase. Especially in cities the rush of daily life could enhance stress. In the questionnaire people were asked to what degree they felt that time was too short and to what degree they felt they didn't have enough time to relax. Almost half (46%) of the respondents said they often had the feeling that there wasn't enough time and a third (33%) reported that they often did not have enough time to relax. So a large group indeed has the feeling that their life was (too) busy. A third question was about the counter part: feeling bored. Only

3% often felt bored, most people (81%) never felt bored. Cronbach's α on these three items was 0.514, leaving the last item out (feeling bored) increased the reliability (Cronbach's α = 0.744). Response to the first two questions were put in one scale ('busy life', 1-5).

In general there is no difference between the degree of being busy and the need for quiet. People with busy lives tend to have the same need for quiet as people with more restful lives. But when we look at different age groups the following pattern appears: the need for quiet does increase with the degree of being busy, but the level differs per age group. Younger people with busy lives do have a higher need for quiet than young people with more restful lives and the same counts for middle-aged and older people. Because younger people in general have a busy life and older people in general have a more quiet life the effect disappears when we look at the total group.

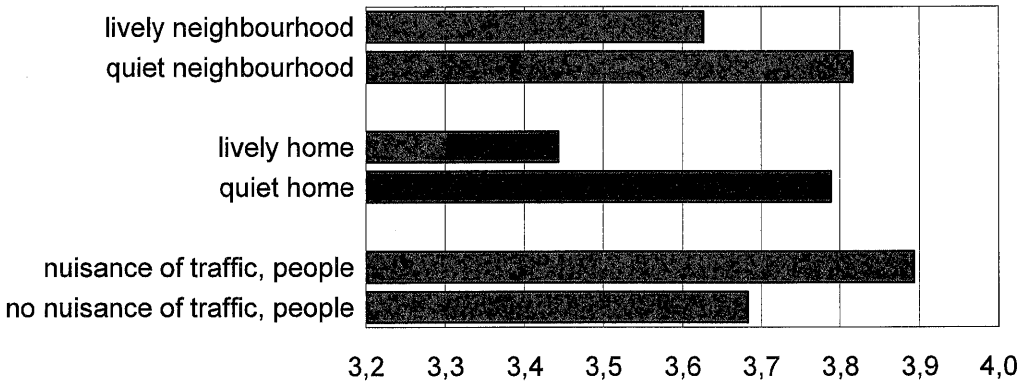
Figure 3 The need for quiet, per age group and level of busy life



Respondents were asked about the level of noise in their home and neighbourhood in different ways. They were asked how lively or noisy it was in their home, their garden or balcony and their neighbourhood. More than a quart (28%) had a lively/noisy neighbourhood, one in five (21%) a lively/noisy balcony/garden and 11% had a lively/noisy household at home. To make a scale of these three variables the reliability was verified (Cronbach's α = 0.514). Leaving the variable 'liveliness at home' out increases the reliability of the scale (Cronbach's α = 0.574). The variables 'liveliness in the neighbourhood' and 'liveliness in the garden/balcony' were put in one scale (1-5). 'Liveliness at home' was taken separately (scale 1-5). People with a lively neighbourhood have a lower need for quiet than people with a quiet neighbourhood. The effect for people with a lively home is stronger: they report very low needs for quiet (need for quiet = 3.4).

The respondents were also asked about the degree of nuisance of different aspects when they were at home. One fifth (20%) had often nuisance of road traffic, a similar number (22%) had often nuisance of airplanes. Nuisance of neighbours (15%) and people on the streets (14%) were less common. Only 8% often had nuisance of buses and trams and the like. These five variables were used to make one scal (nuisance, Cronbach's α = 0.528[12]). The need for quiet increases when people have nuisance of traffic, people or airplanes.

Figure 4 Need for quiet in a lively or quiet neighbourhood or home and nuisance of traffic or people 1)



1) t-test, all differences mentioned are significant at $p < 0.05$

Visiting quiet places or going outside to walk or bike can have a reducing effect on the need for quiet in the city. Fifty percent of the respondents visits a quiet place in the city on a regularly basis. An even larger group (62%) regularly goes outside to walk or bike. People who often participate in relaxing activities have a higher need for quiet than people who do not visit quiet places or goes outside to walk or bike on a regular basis. The need for quiet can be the reason why people undertake relaxing activities.

4 QUIETNESS IN AND AROUND THE HOME AND IN THE NEIGHBOURHOOD

In the former paragraph the variables that have a direct relation with the need for quiet are highlighted. In this paragraph all these, and other potentially relevant variables were put in one model (figure 5). In this model three types of variables (A-C) act on the outcome variable (need for quietness). In the former paragraph we already saw that the need for quiet is related to different individual characteristics, that it depends on the perception of sounds around the home and the neighbourhood and it differs for people with busy or quiet lives. With a linear regression the effects can be made clear in relation to one another. After that a fourth type of variable is added: relaxing activities (D). This is not a variable that explains need for quietness, it is the reaction to the need for quiet. But these activities could also have a reducing effect on the need for quiet.

Figure 5 Model for the need for quiet

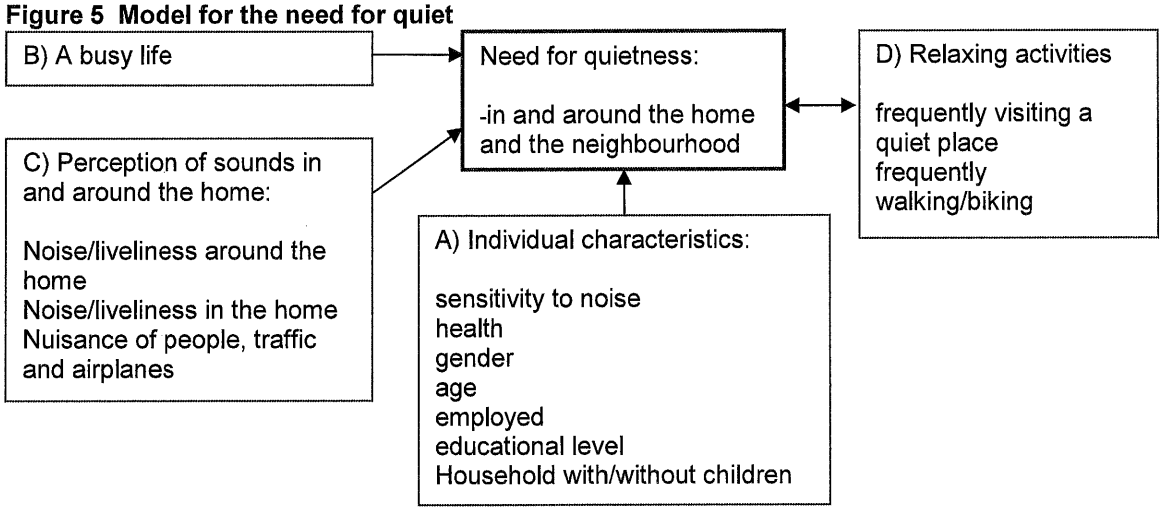


Table 6 shows the results of the linear regression analysis. The blocks of variables are put in the model one by one. First we look at the effect of individual characteristics (Model A), after that the variable 'busy life' is added (Model B), and then we look at the influence of the perception of noise in the neighbourhood (Model C). Model D gives insight in the influence of relaxing activities.

Table 6 The need for quiet in and around the home and in the neighbourhood (N=809), linear regression 1)

	Model A		Model A+B		Model A+B+C		Model A+B+C+D	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.
(constant)	**3,148**	**0,000**	**2,974**	**0,000**	**3,138**	**0,000**	**3,040**	**0,000**
age (15-89 years old)	*0,004*	*0,072*	**0,005**	**0,038**	0,004	0,148	0,003	0,236
gender: female	0,061	0,300	0,053	0,373	0,057	0,328	0,057	0,325
education level: higher education	**0,184**	**0,006**	**0,177**	**0,008**	**0,149**	**0,022**	**0,134**	**0,039**
type of house hold: with children	-0,041	0,546	-0,054	0,425	0,034	0,640	0,033	0,645
occupation: working	-0,003	0,974	-0,020	0,813	-0,021	0,807	-0,023	0,786
part of the city: central	-0,057	0,373	-0,060	0,349	0,004	0,953	0,006	0,928
health situation: poor/bad	*0,168*	*0,077*	*0,157*	*0,099*	0,139	0,139	*0,171*	*0,069*
sensitivity to noise: very sensitive	**0,666**	**0,000**	**0,656**	**0,000**	**0,594**	**0,000**	**0,590**	**0,000**
busy life			0,052	0,164	*0,061*	*0,095*	*0,069*	*0,059*
noisy/lively neighbourhood					**-0,123**	**0,000**	**-0,116**	**0,000**
noisy/lively home					**-0,122**	**0,000**	**-0,122**	**0,000**
nuisance of traffic, people, airplanes					**0,199**	**0,000**	**0,190**	**0,000**
walking or biking on a regular basis							*0,105*	*0,083*
visiting a quiet place on a regularly basis							*0,100*	*0,091*
R^2	0,154		0,156		0,196		0,204	

1) Sig.: bold: $p < 0.05$, italic: $p < 0.10$
B = unstandardized coefficients

From the first model (Model A) we can conclude that the need for quiet is strongly influenced by sensitivity to noise and education level. Age and health have an influence but this is less strong. Other background variables like gender, household type, employment status and part of the city don't have an influence on preference for quietness in the neighbourhood.

In the next model the variable 'busy life' is added. In itself it has no influence but the influence of age in the second model is now stronger. Here the moderating effect of age appears: people with a busy life have a higher need for quiet than people who are not that busy, but on the whole this need is less for young people.
In model C the perception of the noise level in and around the house is included. A positive perception of the noise (liveliness at home and in the neighbourhood) has a negative effect on the need for quiet, a negative perception of the noise (nuisance) has a positive effect on the need for quiet. These perceptions rule out the influence of age and health, but the effect of education level and sensitivity to noise is still there.
In the last model (model D) the influence of relaxing activities (walking or biking or visiting quiet places) is added. Both variables have a small positive effect on the need for quiet. People who have a high need for quiet tend to participate in relaxing activities more often. What is remarkable is the increased influence of health and busy life. This means that people with bad health or a busy life who can't participate in relaxing activities report higher needs for quiet than those who can visit a quiet place or go outside to walk or bike once in a while. This indicates that these relaxing activities indeed have a compensating effect on the need for quiet.

5 DISCUSSION

The results presented in this paper give a first impression of the characteristics of the need for quiet. The picture it presents is quit clear. For a part of the city population quietness is important. The need for quiet is strongly related to perception of and sensitivity to noise. When noise is perceived as a negative factor it increases the need for quiet, liveliness as a positive factor reduces that need (even though sound levels as such may be the same for the noisy and lively situation). It would be interesting to compare the need for quiet with both perceptions on and measured sound levels.
The results show that relaxing activities can have a reducing effect on the need for quiet. This indicates that visiting quiet places can give some relief to people who live in neighbourhoods with higher nuisance of sounds. Most people have the opportunity to go the quiet places and go outside to walk or bike. Especially older people and people with busy lives can benefit if these places are nearby and accessible. In the light of the coming obsolescence the well-being of older and less healthy people will increase in importance and quietness is a factor that can increase this well-being.
It is clear that the liveability of the city not only depends on the absence of nuisance but also on the presence of quietness. And not only the level of sounds is relevant but also the quality of sounds. The city can't be without sound. To make the city a good place to live, attention should be paid to the quality of sounds in the city, quiet areas take a part in this quality.

6 REFERENCES

[1] United nations. *Urban Population, Development and the Environment 2007*, www.unpopulation.org.
[2] www.unpopulation.org, World population prospects 2008.
[3] O+S. *Amsterdam in figures* (Amsterdam in cijfers), different years.
[4] for example: Goossen, C.M., F. Langers & S. de Vries. *Gelderse stilte, onderzoek naar stiltebeleving van recreanten*, Alterra-rapport 398, Wageningen, 2001.
Winsum-Westra, M. van & T.A. de Boer. *Checklist rust, ruimte en stilte, de begrippen rust, ruimte en stilte toepasbaar gemaakt voor inventarisaties in bos- en natuurgebieden*, Alterra-rapport 940, reeks belevingsonderzoek nr. 11, Wageningen, 2004.
[5] Paunović, K., B. Jakovljević, G. Belojević. Predictors of noise annoyance in noisy and quiet urban streets, *Science of the total environment*, 407, pp. 3707-3711, 2009.

[6] Coeterier, J.F. & T.A. de Boer. *Ruimte, rust, en stilte, beleving door burgers en indicaties voor beheer en beleid*, Alterra-rapport 423, Wageningen, 2001.
[7] Goossen, C.M., F. Langers & S. de Vries. *Gelderse stilte, onderzoek naar stiltebeleving van recreanten*, Alterra-rapport 398, Wageningen, 2001.
[8] Pheasant, R., K. Horoshenkov & G. Watts. The acoustic and visual factors influencing the construction of tranquil space in urban and rural environments tranquil spaces-quiet places? *Journal of the acoustical society of America*, 123 (3), pp. 1446-1457, 2008.
[9] Berg, F. van den & H.Booi. The need for quiet in Amsterdam: a survey, *paper presented at Euronoise 2009*, Edinburgh Scotland.
[10] Goossen, C.M., F. Langers & S. de Vries. *Gelderse stilte, onderzoek naar stiltebeleving van recreanten*, Alterra-rapport 398, Wageningen, 2001.
[11] Kamp, I. van H. Davies. Environmental noise and mental health: five year review and future directions, *paper on the 9th International Congress on Noise as a Public Health Problem*, Foxwoods CT, 2008.
[12] leaving nuisance of airplanes out, increases the reliability slightly ($\alpha = 0.553$). But the results on two scales (four nuisance aspects and airplanes separate) were less clear in the regression model than the results on one scale on nuisance including the five nuisance aspects. Therefore the scale on five items is chosen to use in the analysis.