Tranquillity and soundscapes in urban green spaces – predicted and actual assessments from a questionnaire survey

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ABSTRACT

A pilot study had previously demonstrated the utility of a tranquillity prediction tool **TRAPT** for use in 3 green open spaces in a densely populated area. This allows the calculation of perceived levels of tranquillity in open spaces. The current study expands the range of sites to 8 and importantly considers the views of visitors to these spaces. In total 252 face to face interviews were conducted in these spaces. An important aim of the survey was to determine the extent to which reported tranquillity obtained from the questionnaire survey could be predicted by a previously developed prediction tool TRAPT. A further aim was to determine what additional factors may need to be considered in addition to the purely physical descriptors in TRAPT. The questions included the sounds and sights that were noticed, factors affecting tranquillity as well as questions relating to the benefits of visiting these areas. Predictions were considered satisfactory and could be further improved by taking account of issues surrounding personal safety. Examining the trends in these data it was also shown that the percentage of people feeling more relaxed after visiting the spaces was closely related to overall assessments of perceived tranquillity. Further trends and their implications are presented and discussed in the paper.

Keywords: Tranquillity, quiet areas, green spaces, soundscapes, parks, surveys

1 INTRODUCTION

Studies at the University of Bradford have involved the investigation of the environmental factors which influence subjectively perceived tranquillity. Herzog and Barnes (1999) had previously carried out a number of studies into the tranquillity construct and they defined tranquillity as "how much you think this setting is a quiet, peaceful place, a good place to get away from everyday life". This definition has underpinned throughout the research reported here. Statistically significant factors affecting perceived tranquillity that have been identified are the noise level (L_{Aeq} or L_{Amax}) and the percentage of natural and contextual features in the visual scene. The prediction tool for the tranquillity rating was used in a previous study to assess the tranquillity in one park, a small garden and an open green space (Watts et al., 2011). This paper describes and reports on a a questionnaire survey of visitors to green spaces using the updated prediction tool which applied the technique to the 8 such areas all within or close to Bradford city. All but one of these spaces are embedded in densely populated urban areas comprising housing estates and some industrial development. The predicted tranquillity ratings were compared with those obtained from visitors and trends observed with other responses.

2 BACKGROUND

It has been found that quiet and natural green environments are key feature of tranquil areas. Previous research at the University of Bradford has shown that it is possible to predict with reasonable accuracy the perceived tranquillity on a rating scale using two factors: the average noise level from man-made noise sources and the percentage of natural features in the landscape such as vegetation, water and geological features e.g. exposed rock outcrops

(Pheasant et al., 2009). The research has been carried out in the laboratory using the playback of video cuts using binaural recordings in a variety of landscapes from open moors through beach scenes and residential areas to city centres.

The updated formula relating these factors reported recently as **TRAPT** (**T**ranquillity **Ra**ting **P**rediction **T**ool) (Pheasant et al., 2010 and Watts et al., 2011) is given by:

$$T_R = 9.68 + 0.041\, N_{CF} - 0.146\, L_{day} + M_F \qquad (1)$$

Where T_R is the tranquillity rating on a 0 to 10 rating scales. N_{CF} is the percentage of natural and contextual features and L_{day} is the equivalent constant A-weighted level. Contextual features include listed buildings, religious and historic buildings, landmarks, monuments and elements of the landscape, such as traditional farm buildings, that directly contribute to the visual context of the natural environment. It can be argued that when present, these visually cultural and contextual elements are as fundamental to the construction of 'tranquil space' as are strictly natural features. The moderating factor M_F is added to the equation to take account of further factors such as the presence of litter and graffiti that will depress the rating and water sounds that are likely to improve the ratings (Watts et al., 2010a). This factor is unlikely to be large as equation (1) explains 86% of the variance in subjects' scores and in one experiment it was shown that the presence of litter depressed the rating by one scale point.
Watts et al. (2011) describe the behaviour of this equation by examining trends in T_R with L_{day} at different levels of N_{CF}. It is noted that at the extremes of L_{day} where T_R becomes greater than 10 or less than 0 then T_R values are set to 0 and 10 respectively.

3 METHOD

The method involved predicting the tranquillity rating based on predicted values of A-weighted levels during daytime and the percentage of natural and contextual features using equation (1) above. Questionnaire surveys of park visitors were carried in 8 open spaces in the Bradford City area where the dominant source of noise was from road traffic as all parks were surrounded by roads. Only the flows on the busiest roads directly adjacent to the park boundaries are given below. GPS co-ordinates are given for the most tranquil area in each park:

- Ogden Water (*GPS: N 53° 46.571', W 001° 54.553'*): A country park 8km west of Bradford city centre. It comprises a reservoir with wooded slopes and access to open moorland. The closest main road with a 80 km/hr (50 mile/hr) speed limit is at a distance of 350m from the boundary and has a daytime flow of 549 vehicles/hr. The undulating nature of the terrain means that much of the road is screened from view.
- Peel Park (*GPS: N 53° 48.589', W 001° 44.667')*: Irregular in shape with duck pond, formal gardens, mature trees, large statues, childrens' play area and sports fields. A roads runs along the north boundary for part of the way with a day time flow of 336 vehicles/hr.
- Lister Park (*GPS: N 53° 48.811', W 001° 46.418')*: Triangular in shape adjacent to a major radial route into the city centre with a day time flow of 1300 vehicles/hr. Contains mature, trees, formal gardens, iconic building (Cartwright Hall) and boating lake, water features, sports area and children's playground

- Bowling Park (*GPS: N 53° 46.565', W 001° 44.174'*): an irregular shaped space with a road running along the length of the northern boundary with a daytime flow of 384 vehicles/hr. Contains mature trees and shrubs, few formal borders and playing fields to the south.
- Horton Park (*GPS: N 53° 46.939', W 001° 46.439'*): Rectangular park with fairly busy road on north-west boundary with daytime flow of 582 vehicles/hr. Contains mature trees and shrubs, formal gardens, pond with bridge and stream
- Bradford Moor Park (*GPS: N 53° 48.021, W 001° 43.133'*): Rectangular park with a major road adjacent to Killinghall Road on the western boundary. Daytime traffic flow of 1242 veh/hr. Contains mature trees, grassed areas, pond, sports area and children's playground.
- Peace Garden (*GPS: N 53° 47.424', W 001° 45.880'*): a relatively small rectangular space on the edge of the University of Bradford campus and adjacent to a busy route into the city centre (Great Horton Road) with a day time flow of 1060 vehicles/hr. Recently developed to include 1.8m high noise screening wall, herbaceous borders containing mature trees and a small pond.
- Thackley Green (*GPS: N 53° 50.159, W 001° 45.785'*): a simple rectangular grassed open space with few trees and no formal gardens. Adjacent to a major route to Leeds (Leeds Road, A657) and with an industrial estate to the rear. Day time flow 910 vehicles/hr

3.1 Predicting tranquillity

The approach was to identify the most likely tranquil and non-tranquil spaces in these 8 green spaces and calculate the Tranquillity Rating. A previous paper has outlined the method (Watts et al., 2011) and to summarise the steps involved:

1. Noise maps provided by DEFRA
2. Spot readings of A-weighted sound pressure levels
3. Noise predictions based on the UK traffic noise prediction model CRTN
4. Photographic survey of the percentage of natural and contextual features

Steps 1 and 2 were used to assist the most tranquil area at each site, Step 3 was used to calculate the daytime noise index L_{day} and step 4 the percentage of natural and contextual features in the landscape N_{CF} (see Equation 1above). Note that measured sound levels in the open spaces would include natural sounds and the sounds of people and these in general are not considered disturbing. For this reason noise prediction methods are used to separate out the disturbing mechanical noise.

3.2 Questionnaire survey

A questionnaire survey of adult visitors was carried out in each of the green spaces during the daytime. The questionnaire which generally took between 5 to 10 minutes to administer is reproduced in the Appendix. Thirty responses were obtained from each park except Thackley Green which had very few visitors. Consequently for this green space it was difficult to to

collect 30 responses in a reasonable time period. A total of 11 responses were obtained after 3 visits. At Ogden Water because of its size 62 questionnaires were collected at 2 locations at widely separated points. The results from the 2 locations were combined as there were no significant differences between responses. The questions included:

- Sounds that attract attention
- Importance of tranquillity
- Factors that degrade or improve tranquillity
- Rating of tranquillity on a 0-10 interval scale where 0 is “least tranquil” and 10 is “most tranquil”
- Benefits of visiting the park including stress reduction
- Access problems
- Rating pleasantness on 0-10 interval scale

Following the interview, estimates were made by the interviewer of the age, ethnicity and gender of the respondent.

4 ANALYSIS

4.1 Predicting tranquillity

The average ratings of tranquillity made by the respondents were compared with the predictions using equation (1) for the most tranquil part of the green space, least tranquil and

average of the two. It was found that the predicted level of the most tranquil locations yielded the highest correlation with the average ratings obtained from respondents in the survey (r=0.904). In the case of the predicted least tranquil value the correlation with the survey average was r=0.859 and for the average predicted value the correlation was r= 0.898. This was expected as the least tranquil location in each park, usually close to the boundary and hence individual traffic noise sources, was highly dependent on exact measurement position. In contrast the most tranquil location was often found near the middle of the park with high levels of natural features in the visual field. Under these conditions moving several tens of metres had a relatively small effect on the predicted tranquillity rating. For this reason it was decided to use the most tranquil prediction as this varied much less rapidly with distance and was considered a better measure to characterize overall tranquillity as found from the survey. A further point is that visitors will tend to head for the most pleasant parts of the park where often there is relative quiet, natural sounds can be heard and views of traffic roads and buildings outside the park will tend to be obscured by trees and shrubbery. When visitors make assessments of tranquillity in the park it is considered that it will be these places that will weigh most in making judgements.

The results of the photographic survey showed that in all cases positions close to the middle of the parks with highest tranquillity contained the highest percentage of natural and contextual features. Being away from the major road, lawns, trees and contextual buildings and walls tended to dominate the scenes Close to the park boundaries with higher noise levels from traffic the scenes included vehicles, housing or industrial buildings.

Table 1 summarises the calculated L_{day} values at the most tranquil and least tranquil parts of each green space using the UK traffic noise prediction method CRTN and the percentage of natural and contextual features from the photographic survey together with the corresponding predicted Tranquillity Rating (T_R) and the average ratings obtained in the questionnaire survey. The spot readings in the open spaces confirmed the validity of the predicted values. The categorisation of tranquillity for descriptive purposes is based on earlier considerations (Watts et al., 2011) and the following provisional guidelines in describing the levels of tranquillity achieved are:

<5	unacceptable
5.0 – 5.9	just acceptable
6.0 – 6.9	fairly good
7.0 – 7.9	good
≥ 8.0	excellent

If these descriptors apply then from the questionnaire results shown in Table 1 it can be seen that the highest level in Ogden Water and Peel Park falls in the "excellent" category. At Ogden water the main road is at a distance of 350m and subtends a small angle of view even at the most exposed location due to hilly nature of the terrain. At Peel Park the traffic noise on the main roads on the two boundaries (north and west) are effectively screened by walls and 2 storey buildings and to the fact that substantial areas lie in a hollow at a level below these roads. The other parks except Bradford Moor reach an estimated "good" or "fairly good" level of perceived tranquillity.

Table 1: Tranquillity ratings

Location	L_{day} (dB(A))	Percentage of natural and contextual features (N_{CF})	Tranquillity rating (0-10)	
			Predicted (T_R)	Actual (average from survey)*
Ogden Water				
Most tranquil	36.2	100	8.5	8.8±0.2
Least tranquil	45.6	58.9	5.4	
Peel Park				
Most tranquil	44.2	99.2	7.3	8.4±0.2
Least tranquil	58.0	88.3	4.8	
Lister Park				
Most tranquil	51.8	97.7	6.1	7.8±0.4
Least tranquil	71.1	73.7	2.6	
Bowling Park				
Most tranquil	47.3	87.8	6.4	7.4±0.3
Least tranquil	50.8	82.2	5.6	
Horton Park				
Most tranquil	43.5	85.3	6.8	6.7±0.3
Least tranquil	54.5	78.8	5.0	
Bradford Moor Park				
Most tranquil	51.8	90.2	5.8	5.4±0.7
Least tranquil	71.9	79.3	2.4	
Peace Garden				
Most tranquil	60.7	55.6	3.1	4.9±0.8
Least tranquil	70.0	30.9	0.7	
Thackley Green				
Most tranquil	60.4	56.1	3.2	2.9±0.9
Least tranquil	75.7	27.3	0.0	

*95% confidence interval attached to mean values

Bradford Moor Park is quite small and has a major road adjacent to its longest side. There are no substantial walls along this boundary to prevent the spread of traffic noise into the park. There also views of surrounding buildings which reduced N_{CF} somewhat. This has resulted in

relatively high levels of noise (L_{day}) at the most tranquil position and the average tranquillity rating was "just acceptable". The Peace Garden and Thackley Green are even smaller than Bradford Moor Park and had average ratings less than 5 i.e. "unacceptable". Both are relatively small green areas and due to the proximity of heavily trafficked roads it can be seen that noise levels are relatively high at the most tranquil locations. Because of their small sizes views of buildings are not obscured to the same extent as larger parks and this will tend to reduce the N_{CF} variable and hence T_{R}.

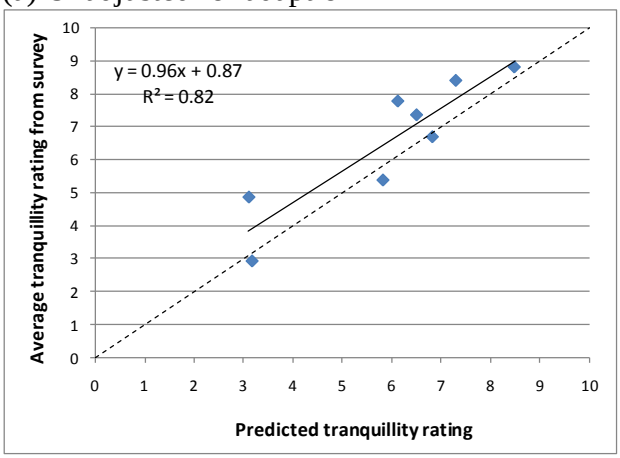
The range of *predicted* tranquillity experienced in each park varies such that the greatest range was predicted for Lister Park (2.6 to 6.1) and the smallest for Bowling Park (5.6 to 6.4). The higher range at Lister Park is in part due to the highly trafficked radial route into the city centre and the lack of screening adjacent to this road. For example there is a lack of high boundary walls or buildings between this road and the park. In contrast Bowling Park has a much lighter traffic flow at the boundary and there are substantial stone walls with few gaps providing significant screening. In contrast the range of values obtained from respondents in the surveys were small with the 95 percent confidence interval of the mean ranging from 0.2 to 0.9. The small interval suggests that respondents were generally adopting a similar approach in rating the open spaces. As mentioned above it is unlikely that some were basing their rating on parts nearest the road where tranquillity levels were low.

4.2 Predicted and reported tranquillity

A strong relationship would indicate the utility of the model in practice for design and improvement purposes. For this reason the average rating obtained in the open spaces were regressed against the levels predicted in the most tranquil areas of each space. Figure 1a

shows the relationship with a linear trend line applied. There is likely to be some variation between predicted and actual values due to the subjective nature of the variables involved and the fact that not all variation is taken into account by the two variables in equation (1) L_{day} and N_{CF}. Despite this it can be seen that the relationship is close (R^2=0.82, p<0.01). However, the regression line is offset by 0.87 scale point so that it does not pass through the origin. It is considered that this is due to the different conditions operating in the laboratory where the TRAPT was developed. In this situation subjects were exposed to a very wide range of stimuli including remote coastal areas and moorland areas as well as busy streets. Under these conditions it is likely that judgments were conditioned by these very tranquil areas so that when judging the urban spaces there ratings tended to be lower than expected. For citizens living in urban areas and travelling to the nearest park their ratings given in the questionnaire survey would have been conditioned mainly by their immediate experience of probably busy places and congested streets so as a consequence their ratings in the park would be expected to be relatively high. By adjusting the constant in equation (1) from 9.68 to 10.55 and re-plotting the data it can be seen that the regression line now passes close to the origin as would be expected (Figure 1b). In the light of this finding it may be necessary in a further development of TRAPT to consider applying this correction when making predictions of tranquillity in essentially urban environments. This correction of the constant in TRAPT is discussed in Section 5 below.

(a) Unadjusted for adaption



(b) Adjusted for adaption

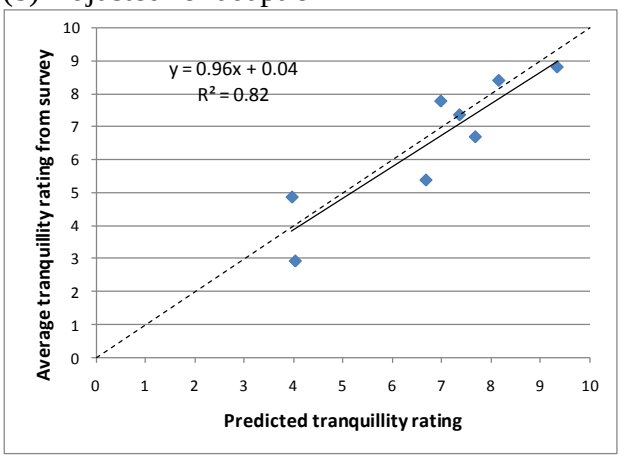


Figure 1: Predicted and average tranquillity rating from survey

It was found that the rating could be improved considerably by including a factor missing from TRAPT i.e. a measure of poor maintenance conditions. It was considered that it was likely that part of the effect of this factor could be accounted for by the presence of very noticeable amounts of litter and graffiti in the green spaces. In a previous jury experiment using a controlled space where judgements were made with and without litter present it was found that litter could depress the tranquillity rating by 1 scale point. If this were adjustment were applied then the predicted ratings in Bradford Moor and Horton Park where there were very noticeable amounts of litter and graffiti would be reduced by 1 point. The effects of these adjustments are shown in Figure 2 where the regression line is also shown together with the improved R^2 value of 0.89 (p<0.001).

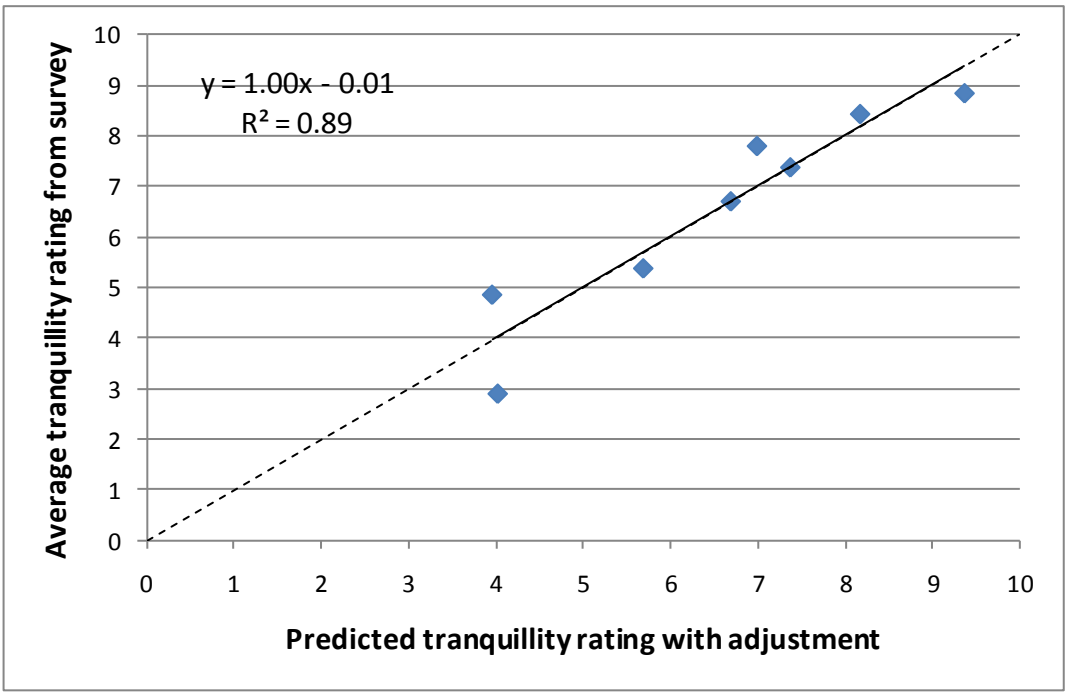


Figure 2: *Predicted and average tranquillity rating from survey with adjustments made for adaption, litter and graffiti*

4.3 Soundscape

The question: "In this park/ green/ garden what sounds attract your attention the most?" produced a large assortment of replies and these were categorised as:

- "Natural sounds" including sounds made by birds, animals, water and wind through leaves and branches
- "Mechanical noise" including noise from traffic, individual vehicles, aircraft/helicopter noise, industrial noise and powered tools

- "People sounds" including people conversing and laughing, music and electronic sounds from hand-held devices
- "Children playing" including children in playgrounds and playing games in the open spaces

Figure 3 shows the types of sounds attracting attention most in each of the parks. The bars are ordered in terms of the average tranquillity rating from the survey.

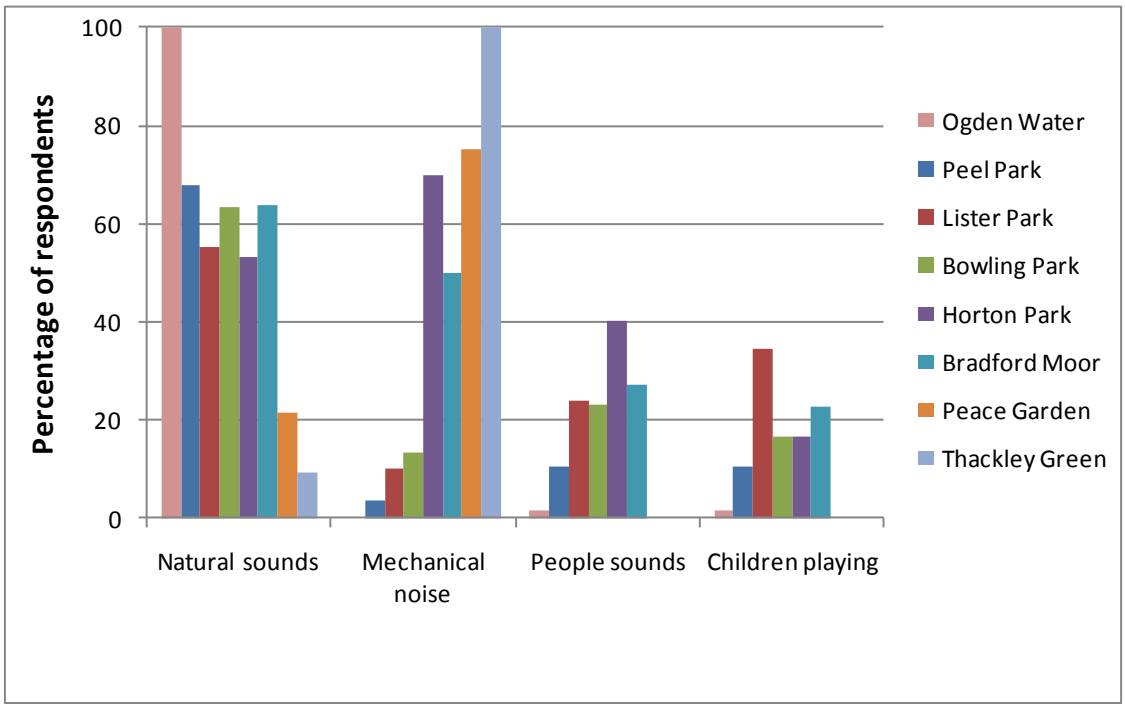


Figure 3: Sounds attracting attention

It can be observed that there are wide variations across green spaces in the percentages reporting natural sounds and especially mechanical noises. Overall 54% of respondents reported natural sounds, 40% mechanical noise, 16% people noise including music and 13% reported the sounds of children at play. By inspection it can be seen that visitors in the most tranquil parks such as Ogden Water, Peel and Horton more often report natural sounds and

fewer mechanical sounds than visitors to the least tranquil spaces such as Thackley Green and the Peace Garden.

4.4 Benefits of tranquil soundscapes

The benefits of visiting the park were obtained by asking: "Do you feel 'more relaxed', 'less relaxed' or 'no change' after visiting this park/ green/ garden?" The percentage of respondents reporting they were more relaxed was plotted against the average tranquillity rating reported by respondents. This relationship is very strong (R^2=0.96, p<0.001) as can be seen in Figure 4.

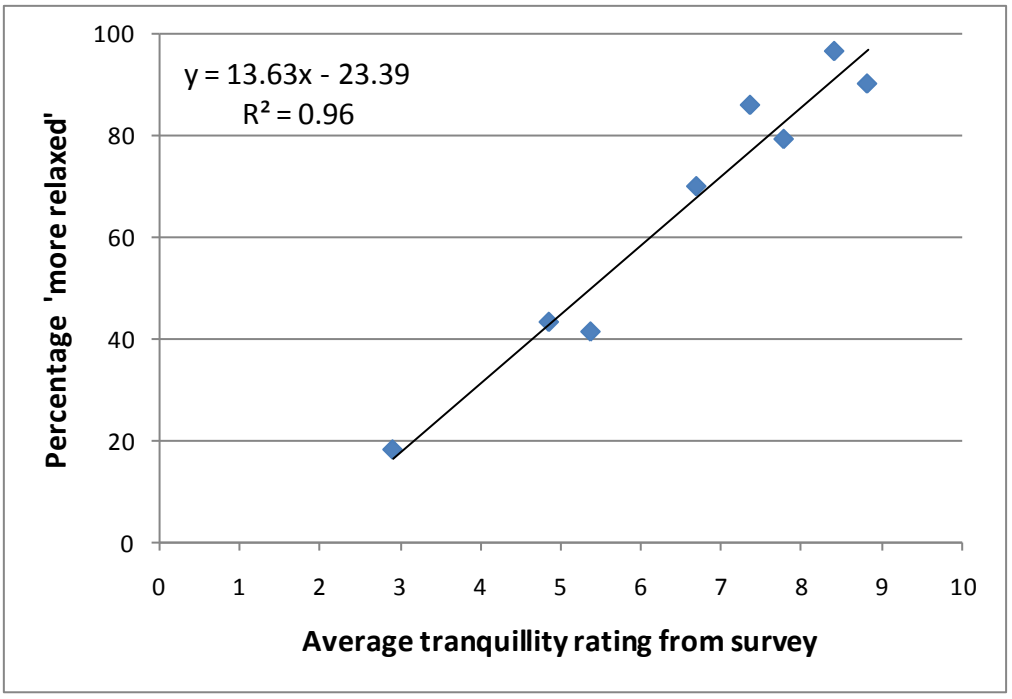


Figure 4: Percentage of respondents reporting they were 'more relaxed' after visiting the green space by average tranquillity rating from the survey

At a rating of approximately 2 it is predicted that no visitors would have reported being 'more relaxed'. Clearly this indicates a lower bound to the tranquillity rating for creating spaces with

restorative value. For a 50% response the average tranquillity rating would need to be 5.4 and for a 75% response the rating would need to be 7.2. This lends some support to the judgements noted in section 4.1 that an “acceptable” level of tranquillity was considered to be ratings in the range 5.0-5.9 and a “good” level was considered to lie in the range 7.0-7.9.

5 DISCUSSION OF RESULTS

5.1 Predicted ratings and adjustments

It can be seen that the predicted tranquillity rating agrees well with the average obtained from a survey of visitors. There are factors that can add ‘statistical noise’ to the ratings obtained in the park which can affect the relationship with the predicted levels. These include weather conditions, number of people in the park and the route visitors take through the space before they are interviewed. However, two factors that are most likely to produce a systematic effect on survey ratings are issues surrounding adaptation level and personal safety. As mentioned above it is likely that visitors to urban parks including country parks on the fringes of such areas will have been adapted in the recent past to relatively high levels of urban noise and urban landscapes lacking significant amounts of greenery. The application of Adaptation-Level Theory (Helson,1964) suggests that an urban park is likely to be more highly rated in terms of tranquillity than similar scenes simulated in the previous laboratory studies where subjects were exposed to remote rural areas as well as city locations when making judgements. Consequently it may be necessary to calibrate the prediction of TRAPT to take

account of this effect when used in areas of dense population. The following formulation (2) includes the adjustment factor of +0.87 to take account of this urban adaption.

$$T_R = 10.55 + 0.041\ N_{CF} - 0.146\ L_{day} + M_F \quad (2)$$

It is likely that where there are signs of disorder evidenced by litter, graffiti and damaged equipment, where there is abusive language used or where, mopeds, motorcycles or quad bikes are ridden illegally around the park then tranquillity will be reduced. This is of course not addressed in TRAPT since the main factors relate to the physical parameters of average daytime noise level and the percentage of natural and contextual features in the landscape. However it should be noted that these two factors alone account for 82% of the variance in subject's scores. When this degrading factor is taken into account it is likely to improve the predictive power of TRAPT. In this survey the R^2 value was increased from 0.82 to 0.89 when incorporating a simple and practical approach of applying a penalty of 1 scale point to those green spaces with very noticeable amounts of litter / graffiti (i.e. Bradford Moor Park and Horton Park). Based on jury assessments of tranquillity with and without litter present this adjustment has been suggested in previous work as a modifying factor M_F (Watts et al., 2010a). Further research is planned to quantify the effects on T_R of other moderating factors such as the presence of water sounds but at the time of writing there is insufficient information to provide guidance.

5.2 Benefits of tranquil open spaces

Natural sound s are preferred over man-made sounds in visitors to country parks (Lam et al., 2008) and in the present study the percentage reporting natural sounds is relatively high in the more tranquil parks and less in the least tranquil spaces. The widespread perception of tranquil sounds in conjunction with the presence of vegetation has been shown to be associated with improved tranquillity. These are precisely the features that characterise natural surroundings. Earlier studies have shown a link between natural surroundings and the reduction of stress (Ulrich et al., 1991), recovery from surgical interventions (Ulrich, 1984), pain relief (Lechtzin et al., 2010) and enhanced neural connections in the medial prefrontal cortex of the brain (Hunter et al., 2010). This study has shown the percentage stating they are more relaxed after visiting the green space is closely associated with perceived tranquillity. In fact at a tranquillity rating of 5.4 (a "just acceptable" level of tranquillity) it is predicted that 50% of visitors would feel more relaxed after a visit to such a green space. In the sample of urban parks set in a densely populated area it is interesting to note that only 2 green spaces failed to reach this minimum level of perceived tranquillity. A previous analysis has shown that the size of the open space is important in terms of assisting the attenuation of noise from busy roads on the perimeter and in maximising the presence of vegetation in the visual field (Watts et al., 2010b). Clearly for improving the tranquillity in small parks bordered by heavily trafficked roads this poses a major problem. Methods of mitigating traffic noise are well known and suitable plantings can assist in improving the percentage of natural features. A further option is to distract or mask traffic sounds with suitable water features and a recent study has indicated the appropriate sounds that can be generated for this purpose (Watts et al., 2009) though no moderating factor M_F is yet available.

6 CONCLUSIONS

Four parks Ogden Water, Peel, Bowling and Lister achieved “good” to “excellent” average tranquillity ratings in the survey. Overall the results were considered surprising good bearing in mind the fact that all parks apart from one (Ogden Water) are embedded in densely populated urban areas within 3km of Bradford city centre. The smallest open spaces had the lowest average tranquillity ratings and this is in line with a previous analysis which modelled the effects of size on maximum tranquillity rating that is likely to be achieved.

The tranquillity prediction method TRAPT has been shown to produce good predictions of assessment e.g. at the planning stage or when improvements are being considered. However, it was considered necessary to add a small correction factor of 0.87 a scale point to account for the likely adaptation by visitors living in the largely urban environments studied. The revised formula is given in equation (2) above.

It was shown that there was a wide variation across green spaces in the percentages reporting natural sounds and especially mechanical noises. This gives useful insights into improving non-tranquil areas. Creating tranquil soundscapes in urban areas is a challenge which will involve creating spaces where natural sound sources are dominant and where there is a corresponding reduction in the prominence of man-made sounds especially traffic noise.

An important finding of this study is that the percentage stating they are more relaxed after visiting the green space is closely associated with perceived tranquillity. In fact at a tranquillity rating of 5.4 (a “just acceptable” level of tranquillity) it is predicted that 50% of

visitors would feel more relaxed after a visit to such a green space. This rises to 75% at an average tranquillity rating of just over 7 (considered "good"). Tranquil environments can be considered "restorative environments" and other studies have shown benefits ranging from reduction in stress, enhanced recovery rates from surgical interventions and improved pain relief.

ACKNOWLEDGEMENTS

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Appendix on sheet below.....

APPENDIX

Open space questionnaire survey

Park / green / garden: _____ Date: _____ Time:_____

Background conditions: temperature_____, precipitation_____, wind_____, sunshine____
Perceived personal comfort of interviewer: "uncomfortable", "neutral", "comfortable"

1. **What was the main reason for your visit to the park / green / garden today? _____**
   _____
2. **In this park /... what sounds attract your attention most? _____**
   _____
3. **In this park /... what things that you can see attract your attention most? _____**
   _____
4. **How important is the tranquillity /peacefulness of this place? Is it "very important"," fairly important" or "unimportant"?_____**
5. **What factors reduce the tranquillity /... of this park /...? _____**
   _____
6. **What factors improve the tranquillity /... of this park /...?_____ _____**
   _____
7. **Rate the tranquillity (...) of this park /... by choosing a number between 0 to 10 where 0 is "least tranquil (peaceful)" and 10 is "most tranquil (peaceful)" (*show numbered rating scale card*) ___**
8. **Do you feel "more relaxed", less relaxed" or "no change" after visiting this park /...?____**
9. **Any other benefits? _____**
10. **Do you have any problems reaching this park /... e.g. too far to walk, parking problems, difficulty crossing the road, health problems? _____**
11. **How many minutes does it take you to reach this park /... from where you live or work? __**
12. **How did you travel to this park /... e.g. walk, by car, by bus, cycle? _____**
13. **How often do you visit this park /... e.g. daily, once a week, once a month?_____**
14. **Is there anything that prevents you visiting the park /... e.g. lack of time, you feel unsafe here, too far, unpleasant surroundings, too few benches, no toilet facilities?**
    _____
15. **What would encourage you to visit more?_____**
16. **Rate the pleasantness of this park (...) by choosing a number between 0 to 10 where 0 is "least pleasant" and 10 is "most pleasant" (*show numbered rating scale card*) ___**

    Estimate age, ethnicity and gender e.g. 35yr Asian male_____
    Interviewer comments _**_____**
    _____
    _____