Public understandings of air pollution: the ‘localisation’ of environmental risk

Karen Bickerstaff*, Gordon Walker

Division of Geography, Staffordshire University, College Road, Stoke on Trent, ST4 2DE, UK

Received 12 May 1999

Abstract

Recent perspectives on public understandings of global environmental risk have emphasised the interpretation, judgement and ‘sense-making’ that takes place, modes of perception that are inextricably tied to aspects of ‘local’ context. In this paper we offer a current picture of the ways in which residents think about the problem of urban air pollution. To do this we utilise elements of a wider research project involving a survey and in-depth interviews with members of the public. In this way — and drawing upon the prior air pollution perception literature and recent work in the field of environmental and risk perception — we present a more analytical interpretation than has hitherto been approached. Conclusions are drawn which stress the localisation of people’s understandings within the immediate physical, social and cultural landscape and also through a trust in personal experiences over any kind of information-based evidence. From this position, and with the development of implications for policy, we demonstrate the need to study public perceptions if the objectives of air quality, and more generally, environmental management are to be achieved.

Keywords: Air pollution; Local context; Social construction

1. Introduction

Urban air pollution is one of several major atmospheric pollution problems or environmental risks currently confronting the world’s population. When it is realised that the health of 1.6 billion people may be at risk from poor urban air quality, it becomes clear that the issue ranks alongside such international problems as acid rain, stratospheric ozone depletion and even global warming (Elsom, 1996). Air pollution is a growing problem because of rising urban populations, unchecked urban and industrial expansion and the phenomenal surge in the number and use of motor vehicles. Research in the UK by Her Majesty’s Inspectorate of Pollution (1993) as well as reports by the House of Commons Transport Committee (1994) and the Royal Commission on Environmental Pollution (1995) support the current consensus that urban traffic should be the focus of policy action if air quality is to be improved. In this respect urban air pollution represents a thoroughly social problem — as too its resolution. If a durable improvement is to be achieved, a shift in personal behaviour, in particular the decisions that people make about transport choice, toward a more sustainable way of life is fundamental. The corollary to this is that the public will have a major stake in the determination of future programmes for dealing with air pollution (Department of the Environment, 1997). An intrinsic knowledge of people’s perception of environmental problems, and in this instance urban air pollution, is therefore vital. It is within this policy setting that the recent growth of interest, both academic and political, in the study of public perception in relation to the environment and sustainability is set. ‘Official reports now present a sustainable world as requiring the participation of everyone, providing knowledge, making decisions and changing their daily routines’ (Myers and Macnaghten, 1998, pp. 333–334). However, scant attention has so far been paid to the problem of urban air quality. Of relevant studies the majority are public opinion surveys carried out in the United States almost three decades ago. Since this time there have been major changes in the principal types and sources of pollution and in the social context within which these are ‘perceived’.

* Corresponding author. Tel.: + 44-1782-294-105; fax: + 44-1782-747-167.
E-mail address: k.j.bickerstaff@staffs.ac.uk (K. Bickerstaff).

0959-3780/01/$-see front matter © 2001 Elsevier Science Ltd. All rights reserved.
PH: S 0 9 5 9 - 3 7 8 0 ( 0 0 ) 0 0 0 6 3 - 7
In this paper we offer a current picture of the ways in which residents think about air pollution. To do this and in order to present a more analytical interpretation than has hitherto been achieved, we integrate the findings of a quantitative survey and a series of in-depth qualitative interviews taken from a research project in Birmingham (UK) examining people’s perceptions of urban air pollution problems. For the purposes of comparison we draw upon the prior air pollution perception literature and more recent empirical and conceptual findings generated in the field of environmental risk perception research — which together enable the development of a more dynamic understanding of how and why people perceive as they do. In this account, and through a focus on the cognitive, spatial and health aspects of perception, we demonstrate the crucial position of direct experience and local context in understanding reactions of Birmingham residents to urban air pollution. Conclusions are drawn about the social construction of air pollution perception and the implications of this type of work for policy and public communication initiatives aimed at air quality, and more generally environmental, improvement.

We begin our discussion by describing the existing literature on public responses to air quality — and in particular focus on the problems and limitations with this existing body of work. We then discuss the research methods employed and review the findings of the research, beginning with an evaluation of the modes by which people understand air pollution, concentrating on the role of direct experience in comparison with media or secondary information. Following on from this we identify and consider the spatial dimensions to perception (cognitive and affective) and the perceived individual and societal health impacts associated with urban air pollution.

2. The air pollution perception literature

Many public opinion surveys were conducted in the 1960s and 1970s in the United States to assess the level of people’s awareness of air pollution. The first public opinion surveys were carried out by the State of California Department of Public Health in 1956 and measured the social and psychological dimensions of air pollution. Over the whole sample they hoped to find the extent of the state’s air pollution problem as measured by people’s awareness of it and by the effects on health and daily living that people attributed to it (Billingsley, 1974/1975). Other one-off and independent studies were carried out in many other US states during the 1960s and 1970s (e.g. Shusky, 1966; deGroot et al., 1966; Medalia and Finkner, 1965) and although the fundamental objectives remained, the studies differed in the stress placed upon the human implications (perceived impacts) of air pollution and people’s responses (attitudes and behaviour). In the UK much of the early work on the perception of air pollution focused on the operation of Smoke Control Areas under the Clean Air Act, 1956. In the early 1970s a number of researchers investigated public responses to air pollution on a broad scale (McBoyle, 1972; Blacksell, 1972; Kirkby, 1971; Billingsley, 1974/1975; Wall, 1974). These scholars undertook the studies in different cities but as part of a collaborative effort, which enabled a greater degree of comparability than was achieved in the American studies. Since this time there has been very little equivalent work, with the exception of some limited research commissioned by the Department of Environment (1994, 1995b), an absence which reflects the decline of urban air pollution as a policy issue.

A number of general themes of evidence over the body of work can usefully be reviewed — relevant to the findings we present here. At the broad level two sources of personal cognition have consistently been shown to influence public awareness of air pollution, the nature or level of air pollution (Smith et al., 1964; deGroot et al., 1966; Prescott-Clarke, 1982; Swan, 1970; Wall, 1974; Zeidner and Shechter, 1988) and publicity about it (Medalia and Finkner, 1965; Auliciems and Burton, 1971; Kirkby, 1972). It is therefore not possible to ascertain from the combined research effort whether people were actually perceptually aware of polluted air in their environment or if they were more likely to base their responses on media coverage.

In relation to the level of awareness, a review of US public opinion polls reveals an increased recognition of air pollution over time. In a 1965 study, 28% of a national sample said that air pollution was at least somewhat of a problem in their area, the corresponding survey in 1966 found an equivalent 48% (Billingsley, 1974/1975). A Harris poll in 1967 found that 56% of respondents noted an air pollution problem in their area, in 1970 this had risen to 70%. In contrast, the majority of the community opinion surveys found that few people spontaneously expressed concern about air pollution, even if they lived in particularly heavily polluted areas (Auliciems and Burton, 1971; Rankin, 1969; Smith et al., 1964).

There is also general evidence in the survey work for a ‘neighbourhood halo effect’ in which individuals show a reluctance to attribute high-level air pollution to their home area. A number of researchers (Rankin, 1969; deGroot, 1967; Shusky, 1966; McBoyle, 1972) found that respondents in their studies consistently perceived the immediate communities to have less pollution than other areas. deGroot et al. (1966) stress the importance of neighbourhood satisfaction over physical experience in the formation of environmental perception. The researchers found that respondents less satisfied with their local area were more likely to note air pollution there and to rate it as a serious local problem. In this respect social dimensions of the local context, as distinct
from a physical evaluation of air pollution, are implied as important in the perceived salience of risk.

Another aspect of air pollution awareness involves public consciousness to the potential link between air quality and health. The focus group study (Hedges, 1993) of people's perceptions of air quality and official information services, commissioned by the UK Department of the Environment, found that adverse effects of air pollution were widely assumed. However, precise health links were generally unclear, with symptoms such as chestiness, asthma, sore throats, headaches, fatigue and irritability confused with other causes. Although not academic this research was unique in its application of a qualitative methodology, and in this sense presented a rare insight into the social and cultural influences that shape people's perceptions of air pollution.

In a number of the early perception studies, concern for air pollution was positively linked to respiratory impairments (Barker, 1976) or the perceived threat to health (Medalia and Finkner, 1965; Billingsley, 1974/1975). Several of the public opinion surveys revealed high-level identification of health impacts only when respondents were asked directly (Shusky, 1966; deGroot et al., 1966). This has been explained in terms of psychological masking, in which a worrisome situation is hidden or put aside to avoid its overt recognition (Crowe, 1968). Other researchers found that although respondents recognised the existence of serious air pollution, they denied the potential for adverse effects to themselves (Wall, 1973; Billingsley, 1974/1975).

Although extensive (in a numeric sense), a number of fundamental gaps or weaknesses exist in the air pollution research effort to date, which restrict the scope and/or transferability of the findings. Current research related to air pollution reflects a strongly techno-scientific epistemology with stress on a demonstrated understanding of the chemical processes that are involved. So although there is a relatively large amount of recent work on air pollution and human health, effects on plants, measuring techniques, methods of control, etc. (the physical dimension), there is a paucity of research on psychological and behavioural responses to air pollution (the social side). At the methodological level research instruments have in the main ranged from quasi-experimental (e.g. Swan, 1970) to opinion polls (e.g. Department of the Environment, 1994). Most studies report findings in quantitative, descriptive terms and in isolation can provide only a superficial view of the processes which underlie perception. Added to this, across the studies, there is wide variability in the timing of the interviews (both seasonally and over the years), the spatial scales, questionnaire format and methods of sample and population selection.

At the epistemological level the work lacks any real theoretic or conceptual basis. The frequency distributions and correlations that are presented say little about perceptual variations associated with air pollution. It is hard to imagine that social and cultural dimensions do not play an important role but this has not yet been investigated in any detail. Indeed, a number of the early scholars acknowledged such an inadequacy in their own work. For instance Medalia and Finkner (1965), in recognising that changes in the socio-cultural systems could be increasing concern for air pollution whilst physical levels were decreasing, identified the need for a broad attack on the relationship between the social and physical system dynamics. In understanding this theoretical deficiency an important issue is the general reliance on quantitative survey techniques and the relative absence (with the exception of the Hedges study) of more contextually grounded research approaches consistent with qualitative inquiry.

The uncertainties and contradictions which pervade the findings of the air quality perception literature, inextricably connected with the methodologies from which they derive, constructively informed the research design process. The chosen methods and the rationale for their selection are discussed in the following section.

3. Research methods

The research undertaken in Birmingham, the second largest city in the UK, involved examining public perceptions of air pollution, the extent of any behavioural responses to poor air quality, and attitudes towards various aspects of policy practice including air quality information. The data collection was undertaken in 1996, and comprised a mixed methodology involving a questionnaire survey followed by a series of one-to-one interview discussions. This provided for both breadth and depth in the research work. Three diverse residential districts were selected on the basis of socio-economic status, using data for educational attainment, occupational group and level of car ownership (as defined by 1991 Birmingham ward census), and to achieve a cross-section in each area in terms of proximity to sources of pollution (industrial and transport sources). In relation to the census data, the final wards chosen were identified as characteristic of high, moderate or low socio-economic status (relative to each other and also other Birmingham wards). A total of 378 questionnaires were returned complete, this was a response rate of 84%. One-to-one semi-structured interviews were subsequently conducted with 50 of the questionnaire respondents selected on the basis of demographic characteristics, stratified into the three socio-economic status groups, such that consistency was maintained with the overall sample population. The selection procedure also sought to achieve diversity in the attitudinal and behavioural positions revealed by the survey data.
The questionnaire survey provided the ‘breadth’ coverage, in particular enabling the description of perceptions and behaviours at the surface. However, the one-to-one interviews allowed a more in-depth exploration of perceptions and attitudes, with the intensive or micro interview structure as ‘stimulus materials’. The first, the Department of the Environment’s ‘Summertime Smog’ leaflet (DoE, 1995a), was sent out to the interviewee prior to the discussion. The second, a weather forecast extract including an air quality report taken from a broadsheet newspaper, was presented to the individual as an explicit component of the interview procedure.

The survey data, in the form of questionnaire responses, was coded and statistically analysed — bivariate relationships were investigated using the chi square test of significance ($\chi^2$). The one-to-one interview material was transcribed and interrogated through the application of a consistent, hierarchical coding procedure (Miles and Hubermann, 1994), facilitated by the ‘cut and paste’ functions of a word processing package. The discussion which follows integrates both survey and interview data, in the process examining some of the similarities and differences which have emerged from each of the approaches to accessing public perceptions and understandings.

4. The cognitive sources of air pollution perception

In this section we consider the research findings in relation to the sources of people’s perceptions of air pollution and seek to evaluate the comparative significance of direct experience and secondary information.

Table 1: The sources of air quality awareness

<table>
<thead>
<tr>
<th>Source of evidence</th>
<th>Health effects</th>
<th>Visible indicators</th>
<th>Smell</th>
<th>Taste</th>
<th>Weather</th>
<th>Media</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of total population</td>
<td>22</td>
<td>13.5</td>
<td>13</td>
<td>2.6</td>
<td>5.8</td>
<td>3.4</td>
<td>0.5</td>
</tr>
</tbody>
</table>

*Individuals could respond under more than one category.

The questionnaire survey included a measure of how aware people were of poor air quality episodes. Over half (56%) of respondents identified an awareness of negative conditions. An open-ended question explored the means by which individuals became aware of poor air quality (see Table 1). The single most important source proved to be health associated impacts (22%), followed by the different types of sensory evidence (together 29.1%) and 5.8% weather conditions. Direct, personal experience was clearly formative in each instance.

Sensory experience provided the means by which many people became aware of poor air quality. As detailed in Table 1 visual evidence was identified by 13.5% of the total population, followed by olfactory (13%) and to a lesser degree taste (2.6%) indicators. The importance that was attached to direct experience in the generation of awareness of air quality is consistent with the early air pollution opinion surveys (Swan, 1970; Jacoby, 1976; Wall, 1974; Barker, 1976; Zeidner and Shechter, 1988). The findings are also in line with observations made in other more recent research about the importance of every-day personal experience in providing evidence of local environmental risks (Irwin et al., 1999; Hudson et al., 1998; Moffatt et al., 1995). The positive relationship between an alertness to when air pollution was high and the identification of related health complaints ($\chi$ at 99.9% confidence limit [cl]) serves to re-enforce the role of physical experience in the generation of personal awareness. A positive correlation between awareness and the recognition of non-health based effects was also established ($\chi$ at 99.9% cl).

The one-to-one interviews confirmed the formative role of sense-based indicators as cues to personal awareness and concern. Visible indicators included physical depositional evidence (dust or dirt) at the household level and broader spatial impacts — in particular pollution hazes.

‘Erm yeah I suppose it’s just the odd day, erm that you go out and you realise that objects in the distance, I would say for sort of four or five miles away it’s very hazy and then there’s a good downpour of rain or a light shower and it clears up, and it’s very clear so obviously it’s taking this out, this pollution out of the atmosphere and everything’s extremely clear and very sharp. It makes you realise that there is this air pollution, or there is something in the air that’s causing this effect’ (Interviewee No.42).

---

1 Official public information on air quality has since October 1990 been provided twice daily, since 1995 hourly, through CEEFAX, TELETEXT, a Freephone telephone number and more recently through the internet. Air quality forecasts for the following 24 h are also given twice a day through these sources. A further element of government information provision is a leaflet campaign which has run since 1995, with separate leaflets produced for wintertime and summertime air pollution smog episodes. These leaflets provide information about the causes of smogs and serve a combined of trying to persuade people to protect themselves during episodes of high air pollution and reduce their contribution to air pollution levels. This advice is also conveyed by some media sources (principally television and radio) and on the telephone information service when episodes of poor air quality are predicted or underway.
What was interesting to note was that for many people visible evidence was drawn from the physical concentration of sources or alternatively the effects of air pollution on the wider environment, a tendency which underlines the sheer intangibility of new types of pollutant.

Interviewer: You don’t feel other parts of Birmingham are in any way better or worse?

‘...We’ve got the electric cables over there now … they say that OK them don’t affect you at all - how come grass don’t grow underneath them, you don’t have to mow grass underneath cables the grass doesn’t grow, it’ll grow alongside it but it won’t grow underneath it, never has done, so it’s got to be doing something ain’t it’ (Interviewee No. 41).

Olfactory evidence was for most individuals related to particular sources of smells, dominated by car fumes and emissions from local industries — however, for a number the absence or loss of positive smells was also important; ‘I can’t smell the flowers’, rather than the presence of obnoxious industrial or vehicular smells, with the latter perceived to be masking the former.

‘Even the air’s not the same, mind you Tamworth’s gone bad as well now’.

Interviewer: In what way?

‘It’s the smell, like in Tamworth you can smell the grass, smell the trees, like I got honeysuckle all at the bottom of the garden, you can’t smell it (Interviewee No. 39).

The findings of a review of perception studies by Barker in 1976 are relevant here — even today. She found that tangible and observable features of air pollution influenced public perception of air quality. In general, an increasing proportion of the populations sampled expressed dissatisfaction or concern about air pollution as the concentration of particulate matter increased. The relationship between gaseous pollutants was, however, more obscure; people were unaware of gaseous pollutants unless concentrations reached olfactory thresholds or caused physical discomfort.

For a number of people awareness and concern were linked to primary evidence of the climatic factors that promote air quality problems. Inference for this group (typically of low socio-economic status and/or sufferers of air pollution associated health problems) was drawn not from technical comprehension but rather personalised experience, in other words an alertness to the prevailing weather conditions when the physical manifestations of air pollution were discernible.

In the survey (Table 1) only 3.4% of people who stated that they were aware of when air quality was poor identified media or news formats as creating this awareness and no-one explicitly referred to any of the government’s air quality information. The one-to-one interview discussions likewise revealed that for those few people aware of air quality through secondary information sources, media formats dominated over the government services. Awareness of air quality information was focused upon the weather forecast, identified as an accessible format, both in terms of physical public reach and as an established, widely used source of information. Yet for most people ‘use’ did not represent a conscious decision, rather it was intermittent and accidental – ‘if it’s on I’ll watch it’. Few were seeking out the information or using it on a regular basis (Bickerstaff and Walker, 1999).

Greater importance, however, appeared to be attached to material generated at the local, as distinct from national, level. One example that came up repeatedly in the interviews related to local media coverage, some years previous, of research carried out in the Birmingham area which had linked airborne lead to the impairment of mental abilities in children. In this situation the study’s spatial focus and the direct health impact that was identified (all the more significant for the fact that children were implicated as the principal victims) presented both an immediate and personalised risk.

Physical experience and information sources of air quality awareness were modified and supplemented by another source of secondary evidence, referred to here as ‘informal experience’ which incorporates interpersonal interaction and conversation. In the low socio-economic status area, where source concentration and proximity were high a number of people identified the role of local knowledges, negotiated through social discourse, in the construction and development of air quality perception. A case in point was the high incidence of asthma in children attending one local primary school, offered as evidence of the immediate risks associated with air pollution. For other people, informal secondary evidence referred to ‘lay knowledge’ gained or recounted from wider social or occupational experience. Informal social networks or discursive channels have also been stressed as particularly influential on wider environmental perceptions (Gooch, 1996; Burgess et al., 1991).

Short-term movements out of Birmingham — holidays or deliberate ‘escapes’, provided further comparative evidence. Perception was an outcome of the range of direct experience sources (sensory, health, environmental quality), with the combined impact the more profound given the return from what was consistently recounted as a ‘pure’ or ‘clean’ environment.

‘...When I go, I go every New Year, I go to er Hope Cove and it’s like, it’s a breathe of fresh air, it’s wonderful, and when you come back you can actually smell the... it’s a different air quality altogether, the freshness. In the summer where we go away it’s wonderful, obviously, we go to Spain or France and er we’re camping, on the French coast by Bordeaux, which is miles of pine forest and that [air quality] is lovely’ (Interviewee No. 25).

Positive physical experience likewise informed perception in relation to rural environments, reinforced with the persistent arcadian and pastoral values attached to the English landscape. The linkages between space and air quality perception, all too evident in these examples of
informal primary experience, are considered in greater detail in the following section.

5. The spatial dimension

5.1. The regional context

It has been demonstrated that awareness of and concern about air pollution are very much influenced by the local setting and lived experience. An understanding of perception thus fundamentally requires a knowledge of the ways in which localised assessments of air quality are generated, as well as how and why these differ or conform to wider regional appraisals.

The survey, through an open question format, asked people to suggest where in Birmingham they thought air quality was the worst. Two types of responses were made, those which related to polluter sources and those which related to areas of worst pollution. Forty percent of respondents (Fig. 1) used ‘source proximity’ as the defining criteria, that is roads and motorways (30%) or industry (10%). These figures indicate that for many people air quality perception is spatially bound and corresponds to a source-directed distance-decay relationship, with limited weight attached to more complex processes of environmental dispersion.

Where people identified ‘areas’ rather than sources in responding to the survey question the city centre dominated. The city centre represented the zone of maximum source concentration — assuming the distance decay association — with a reduction in pollution intensity moving outward towards the periphery. The fact that a comparatively low number of people (13%) identified the inner city and 5% a broad (or other) region of the city, would appear to support this inference.

In the interviews the city centre retained its dominance as the most polluted area. This was explained by interviewees as due to:

(i) The assumed polluter concentration — in particular buses, taxis etc.
(ii) Direct experience.
(iii) The vertical, high density built landscape which was recognised to hinder pollution dispersion.

The inner city (either at a general level or in particular areas) was identified by a smaller group of respondents as badly polluted. Although the high concentration of polluter sources represented an important determinant of perception, for many people the low general environmental quality (e.g. tidiness, amount of ‘greenery’) factored in people’s negative evaluation of inner city air quality.

5.2. The local–regional context

As discussed in Section 2 much of the prior literature has pointed to a disparity in the evaluations that people make about air pollution in their immediate locale relative to the wider regional level. The survey therefore asked respondents to rate the air quality in their local area and for Birmingham as a whole on a scale of very good to very poor, the results are shown in Table 2.

The air quality of Birmingham as a whole was identified as very good or good by only a small number of people (9.4%). However, the good/very good evaluations were considerably more prevalent for the local situation (29.4%). This relationship was mirrored for the very poor/poor air quality responses — 52 and 28% of respondents for Birmingham and local air quality, respectively. At face value the figures point to the reluctance of urban dwellers to draw the direct connection between city-wide and local air quality.

The one-to-one interview discussions explored the rationales behind the spatial patterns of perception identified in the survey. Over half of those interviewed recognised local air quality to be above that of Birmingham as

<table>
<thead>
<tr>
<th>Air quality/region (% total pop.)</th>
<th>Very good</th>
<th>Good</th>
<th>Neutral</th>
<th>Poor</th>
<th>Very poor</th>
<th>Do not know</th>
<th>Void</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birmingham</td>
<td>0.3</td>
<td>9.1</td>
<td>36.7</td>
<td>34.3</td>
<td>17.7</td>
<td>1.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Local</td>
<td>6.6</td>
<td>22.8</td>
<td>38.6</td>
<td>16.4</td>
<td>11.6</td>
<td>1.3</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Table 2
Cognitive perception of city-wide and local air quality
a whole, much lower numbers identified the neighbourhood as equal to or below city-wide air quality. In all cases source proximity was pivotal in constructing spatial arguments. However, articulation of above average local conditions in a number of instances lacked conviction, ‘it must be better mustn’t it …’ we’ve got all the trees’, which would suggest a reluctance to acknowledge the reach and associated risks of ‘city-wide’ conditions.

The interview work identified two inter-connected contextual factors which undercut concern for local air pollution; socio-economic status and environmental quality. These factors did not come out strongly in the correlation work, a finding that does point to a level of inconsistency between the two research instruments. The importance of these factors is revealed through a focus on those individuals who acknowledged that they lived adjacent to a polluting source (primarily main roads). An inverse relationship was apparent between socio-economic status and concern for local air quality, the least inverse relationship was apparent between socio-economic status area. Although differences in the local environment were important in understanding why certain categories of people were more or less worried about the immediate air quality, the fact that concern was more intense in the medium, relative to high, status area — even though people’s perceptions of the general environment were similar — demonstrates an independent influence of ‘social class’. There are three alternative sources of explanation for the relationship between socio-economic status and local air quality perception.

(i) In the first instance perception could be viewed as the rational outcome of logical human cognitive processes based upon the source, physical environment and spatial attributes of the local area. One significant dimension in people’s rationales for air quality perception was the importance of particular elements or a more general interpretation of environmental quality — focused on the level of vegetation or greenery. The significance of plants and trees centred upon their role as producers of oxygen and on their aesthetic qualities in representing something natural and ‘of the countryside’. The level of physical management (litter, dog fouling, public indifference toward the environment) informed wider environmental, and for many, air quality perception. In this regard an in-direct association was drawn with poverty — a relationship that was typically identified by individuals of medium or high socio-economic status. It was suggested that the more deprived groups within the society were restricted to residential areas of low environmental quality and that these pre-existing conditions, rather than the social milieu, generated and perpetuated a spiral of public apathy, environmental abuse and physical deterioration.

(ii) The second line of argument asserts the role of financial empowerment, that is the available economic routes open to the individual to act in an efficacious manner to alleviate poor air quality. Where residential location is the outcome of unhindered individual choice, environmental cognition is more likely to be positive in orientation and issue salience low; as one man remarked, ‘market force rules, you get what you pay for’. In contrast, where residence is dictated by restricted economic opportunities, personal choice is obstructed, if not denied and risks are imposed upon the individual. Environmental perception is negative and problem salience high. In this respect the majority of people who identified local air quality as worse than that of the rest of the city were drawn from the low socio-economic status group who articulated intense local environmental as well as air quality anxieties. The profound desire to ‘escape’ the region was unmistakable, yet the absence of alternative opportunities led to a sense of powerlessness — the individuals were trapped in a situation over which they had no control.

(iii) The final rationale is what could be viewed as a public reluctance to recognise negative environmental conditions within the immediate locale — in particular where a general satisfaction with the neighbourhood is shown. In this respect the findings could be taken as evidence for the theory of cognitive dissonance, which as a number of researchers have asserted is the result of inconsistency between actions (the need to live in a safe environment) and beliefs (awareness of pollution and personal risks) which people cannot tolerate for prolonged periods (Wall, 1972; Creer et al., 1970; deGroot et al., 1966). According to Festinger’s observations (1957) the dissonant state will induce the selective distortion of various aspects of the stressful situation to lessen the perceived contradiction (we return to this theme in Section 6 where the perceived health impacts of air pollution are discussed). Public perception could therefore be interpreted as a denial or disassociation from known or potential risks — in other words a reluctance to acknowledge neighbourhood and in consequence personal vulnerability.

Looking at previous research, Rankin (1969), Kromm (1973), Francis (1983) and Shusky (1966) all found that pollution problems were considered to be less serious in the home area than in the city as a whole. McBoyle (1972) commented that no matter what frame of reference is suggested in the question, people tend to answer in terms of neighbourhood experience. Yet his respondents ‘almost never’ included their home area among those
The health impacts of local air pollution

<table>
<thead>
<tr>
<th>Health impacts of air pollution</th>
<th>% of total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>27.5</td>
</tr>
<tr>
<td>Other respiratory problems</td>
<td>7.4</td>
</tr>
<tr>
<td>Allergies and hay fever</td>
<td>8.2</td>
</tr>
<tr>
<td>Headaches and sickness</td>
<td>1.1</td>
</tr>
<tr>
<td>Cough and chest problems</td>
<td>5.0</td>
</tr>
<tr>
<td>Irritation impacts</td>
<td>4.2</td>
</tr>
<tr>
<td>Colds, sinus and catarrh</td>
<td>5.3</td>
</tr>
<tr>
<td>Other</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*Some respondents identified more than one impact.

6. The health impacts of air pollution

It has already been shown that the direct health impacts of air quality represent an important source of local air quality awareness and concern. The initial section in this discussion is descriptive, and sets out public perceptions of the relationship between health and air pollution. This account will demonstrate that people perceived the connection with health problems both at a personal and wider societal level. However, it will be shown that interviewees were more willing to identify the negative impacts of air pollution on other people’s, rather than on their own health. It is also the case that awareness and concern are not always synonymous, individuals could, for instance, be aware of the health impacts on others but show no concern for air quality themselves. The later discussion will provide a more analytical exploration of why some people were perceiving a partial link between air quality and health, or alternatively did not recognise a connection at all.

6.1. Perception of health impacts

Table 3 shows the results of an open survey question which asked respondents whether they were aware of any particular health problems they or family members had experienced that they linked to poor air quality.

Almost half of those surveyed (45%) identified some form of impact, mostly related to breathing, allergic and irritation problems. A high level of identification of personal impacts was likewise evident in the discussion of the methods by which people become aware of poor air quality (see Table 1).

The survey also incorporated two specific questions intended to evaluate the level of concern people felt for the health and local impacts of poor air quality. The first question asked respondents how much air quality worried them locally, whilst the second scale referred to the level of concern people felt about the health impacts of pollution upon themselves and their family (Fig. 2). A very high or high level of worry was expressed by 53.2% of respondents with 50% of people concerned or very concerned about personal health impacts. A consistent pattern of affective perception emerged; strong, highly significant correlations (χ at the 99.9% cl) were
established between all air quality concern measures. It was a very small number of people who had a low level of concern about the health effects of air pollution. Representation was broadly consistent across the very high, high and neutral concern categories. Although the results presented in Fig. 2 do suggest a widespread awareness of the presence of air pollution, there is at the same time a considerable level of apparent ambivalence (the neutral category). In addition, the higher level of air quality concern for family health, relative to personal health, does infer the importance of victim identification. It could be that this differential represents an instinctive parental response to view air pollution as a greater and more acute risk to one’s children than to oneself. The results could also be indicative of a recognition of the long-term impacts of local air quality, intuitively more relevant to children or grandchildren.

In contrast to the survey results, in the interviews relatively few people identified personal health problems that they related to air quality. However, the majority did make a connection between ill health and low air quality at an abstract societal level. The strength with which the association was drawn varied from explicit causation (a relative minority of people) to a factor that exacerbated pre-existing physical complaints. Examples of these different positions are provided in the next section.

### 6.2. The uncertainty of links between air quality and health

In this section we discuss potential explanations for the ‘partial links’ people were making between air quality and health, which emphasised the role of other causes or alternatively the impacts on others rather than themselves. Where people were focussing on the importance of other sources of health problems, with air pollution often attributed a peripheral role, a number of inter-related factors relating to problem or effect visibility help to account for the disparity and the uncertainty that was widely displayed. For many people the identification of a health link was confined to the recognition of impacts on other people. Possible sources of socio-cultural explanation for the difference between perception of personal and societal impacts are also presented.

There are a number of issues that relate to the ‘visibility’ of poor air quality and/or health problems, which are important in accounting for the hesitant and often partial relationship that people were drawing between air pollution and public health. One important factor is the inherent causal uncertainty which necessarily prevails where one component (in this case the atmosphere) is divorced from its holistic context — the environmental system. Two, perhaps entirely valid, consequences result; the physical complaint is either dismissed as ‘not real’ or alternatively causation is attributed somewhere else in the environment. In conversation, natural (e.g. pollen, temperature, weather) and social (e.g. poverty and poor living conditions) environmental determinants were identified either as partial or the dominant source of personal health problems, or their presence was seen as serving to confuse the establishment of causation. These agents, unlike air pollution, provided tangible, immediate evidence of their presence.

‘When it’s been extremely hot I know we’ve opted to stay in as opposed to go out, even though it’s nice’.

Interviewer: The heat or the air quality?

‘I think it’s probably a combination of both, I suppose first reaction is you tend to think it’s just the heat having an effect on you’ (Interviewee No. 23).

For a number of people it was the role of broader socio-cultural influences on the recognition of health problems that was stressed. In this respect several interviewees attributed the rising incidence of childhood asthma to increased diagnosis and over-protective parenting — ‘something’s got to be wrong with the
child’. Perception in this respect serves to reinforce the assertion that views which on the surface may appear well defined, as identified through the survey, can upon detailed inspection be divergent or even contradictory.

Finally, the apparent lack of importance attached to air quality as a risk to public health could relate to its status within wider social and cultural arenas as an unrecognised causal factor. The health relevance of air quality is attributed to a minority group with profound physical problems. In this respect one woman referred to the disbelief of her chemist when she had commented on the possibility of a link:

‘I had burning watering eyes during the summer after going into Birmingham, so I went to the chemist and had a chat to him… they almost laughed when I said you know this is what’s caused it. I said well to be honest with you coming into Birmingham has caused it, they just smiled as if I was crazy’ (Interviewee No. 25).

It has been shown in the interview discussions that the potential for health impacts represented the dominant factor in accounting for people’s expressions of local air quality concern — a link that is also suggested in the survey results. Furthermore, in contrast to the high-level recognition of air-quality-related health problems in the survey, it was a small number of people, with quite profound physical conditions, that identified their own personal health in motivating concern. More prominent in people’s conversation were the impacts of air pollution on society at large or on friends and relations. This same ‘perception gap’ has been identified in many of the earlier air pollution studies (Billingsley, 1974/1975; Wall, 1973). Drawing upon the explanatory theories that have been advanced in the literature, we can identify two specific explanations — of a fundamentally social character — that help to account for the difference between the recognition of air quality as a source of personal and ‘other people’s’ health problems.

In the first instance, low-level personal recognition of a health link could in fact be the result of people’s reluctance to acknowledge the potential for direct impacts and thus the consequent realisation of local, if not personal vulnerability. In this respect Billingsley (1974/1975) attributed the ‘perception gap’ to an expression of personal invulnerability, that is one agrees to the presence of danger, but denies that it will happen to me. In this light, the findings can be viewed as further support for Festinger’s (1957) theory of cognitive dissonance. With regard to air pollution an inconsistency between actions and beliefs could occur for individuals who are aware of breathing polluted air and at the same time know of potentially adverse health effects. Festinger identifies a number or archetypal distortions which would lessen the perceived contradiction; relevant here are the denial of health risk, or the recognition of a general health threat but denial of its personal effect. Beck (1992)2 asserts much the same response to environmental threat as characteristic of the risk society.

‘Affliction by hazards need not result in an awareness of the hazard; it can also provoke the opposite, denial from fear. Wealth and risk distribution differ and overlap in this possibility of repressing the victimisation oneself. Dangers can always be interpreted away’ (p. 75).

The second possible source of explanation is the ascription of responsibility for physical health complaints to natural processes, that is to other components of the environmental system, and a response that enables the individual to relinquish any personal — if not societal — accountability. In effect ignorance of air pollution serves to justify in-action, with causation for health problems presented as beyond human control. Recognition of the contribution of air quality would necessarily implicate the motorist, and thus personal behaviour, in the generation of individual health problems. Crowe (1968) drew a similar conclusion when he interpreted the absence of recognition of a personal health risk as a form of psychological masking. The obvious and innocuous elements of the problem are identified in order to avoid consideration of its more threatening dimensions and the implications which that recognition would carry for action or anxiety. As Burningham and O’Brien (1994) comment:

‘Individuals use of environmental arguments and definitions are motivated by assessments of the context in which their statements are embedded. Participants use environmental arguments and definitions differently depending on their assessment of the immediate interactive context and their goals within it’ (p. 919).

7. Conclusion

Awareness of poor air quality is far from universal. For most people it was a diverse array of localised, physical and social encounters with air pollution that were important in the development of perception. The fundamental importance attached to physical experience does dispute the contention of Beck (1992) that in the risk society:

‘One no longer ascends merely from personal experience to general judgements, but rather general knowledge devoid of personal experience becomes the central determinant of personal experience. We are dealing not with second-hand experience in risk consciousness but with second had non-experience’ (p. 72).

2 The German sociologist Ulrich Beck (1992) in his encompassing reinterpretation of modern society in terms of risk, contends that faith in the old Enlightenment tenets of progress is now giving way to radical doubt, reflexivity and anxiety; the logic of wealth production which dominates the classic industrial society has been replaced with the logic of risk avoidance in the risk society.
Personal appraisals of air quality are far from dependent on second hand (non) experience or expert knowledge. The importance of primary experience is evident in the widespread public recognition of pollutants that could be distinguished through the physical senses. People do recognise that they cannot sense all pollutants and to an extent draw on less substantial forms of evidence; for instance interviewees talked in terms of intuition, effects upon the environment, indicative perceptual cues or the precursors of poor air quality. In this way trust and reliance is still strongly placed in people’s own experience. However, modes of direct personal perception were not ubiquitously employed by all sectors of society but disproportionately associated with those individuals physically sensitive to air pollution or living in proximity to a particular source. Substantial numbers, both in the survey and interviews, were largely unaware of an air pollution presence.

The physical and also spatial criteria which many people were using to evaluate local air quality highlight a disparity with the technical and indiscriminate, in a spatial sense, measurement of pollution currently employed in the official approach to public communication. The implication then, is one of public ignorance of wider processes of dispersion or dangers that are imperceptible to the sensory organs. In this respect an argument can be developed for more visible approaches to public education and information (for instance air quality messages in public places). However, this research has demonstrated that the current influence of external sources of information on public perception of air pollution is minimal. It is suggested that where information, as is clearly the case here, does not validate or engage with people’s own experience of air pollution it is to be expected that it will be judged as irrelevant to most people’s lives and therefore ignored.

In contrast to other researchers (such as Slovic et al., 1980) that have focussed on individual psychology in accounting for the patterns of public perception, this research has stressed the central role of the local and social context in understanding how people make sense of air pollution and thus recognise risk. This conclusion does support recent work in the field of environmental and risk perception which stress the social constructedness of perception and in particular the importance of context (Macnaghten and Jacobs, 1997; Harrison et al., 1996; Irwin et al., 1999). It is therefore inevitable that physical deterioration in other components of the local environment, a lack of political or economic empowerment or feelings of dislike for the immediate environment blend into how people understood and responded to the air around them. It has been suggested that people showed a reluctance to recognise air pollution in their neighbourhood; it can be hypothesised that the linkage between atmospheric and wider environmental perception is an important source of explanation. However, it is also probable that the widespread ignorance of a local problem does indeed offer support for cognitive dissonance theory, or a psychological denial of neighbourhood vulnerability where people hold a strong commitment to the locale. Further evidence is provided in the preference individuals showed to draw the abstract societal rather than personal link between air quality and health. Many people also ascribed dominant causation of health problems at a general and personal level to other more visible dimensions of the environment, both in a physical (i.e. perceptible to the senses) and social sense (air quality as a largely unrecognised source of widespread ill health). Together these responses could be interpreted as more general support for Beck’s thesis of risk society which asserts that with risks it is precisely affliction that can cause a lack of consciousness. ‘The possibility of denying and trivialising the danger grows with its extent’ (Beck, 1992, p. 75).

In this paper we have argued that environmental issues such as air pollution, which is at its root very much a global problem, are always made sense of or localised in the physical, social and cultural context in which individuals live, work and interact with others. In particular, our application of the concept of ‘localisation’ has emphasised the ways in which people’s understandings of air pollution, as too the validity assigned to various claims, are constructed and contextualised within, and in relation to, the immediate locale. In tandem our interpretation encompasses more direct processes of ‘localisation’, with perception crucially informed by personal or more informal encounters with the environment and pollution.

Our conclusions do stress the fundamental importance of social and contextual dimensions in understanding air quality perception. One clear implication is that if we are to secure significant improvement in national and even global air quality an intrinsic knowledge of people’s perceptions and wider value judgements is essential. It follows that if policy and communication frameworks are to achieve durable change in public attitudes, and in turn behaviour, they must move beyond a top–down model of assumed public ignorance and a blind reductionism that isolates and deals with one dimension of the environmental system (air quality) in a physical and social vacuum. It is therefore vital that professional bodies actively acknowledge and seek to engage with the multiple public understandings of air pollution localised in the specific contexts in which people’s goals, values and motives are embedded. As Sagoff (1990) has argued environmental issues are irreducibly moral, civic and communal problems, requiring the discourse of citizenship. Taken from this position, it is local institutions that are best placed to be sensible to regional identities and needs and who can accommodate local differences, diversity and innovation. In this respect a greater emphasis upon local determination does appear to hold the potential to secure the
support and co-operation, of local communities and thereby deliver long-term sustainable air quality objectives. One route to this greater sensitivity to local diversity would be community involvement approaches which draw upon local people in identifying what environmental (to include air quality) issues affect them and how they can be involved in designing and implementing policy and communication responses to the problems. That regional authorities now have a duty, under the Environment Act (1995), to consult with various parties at different stages of the air quality management process does give cause for some optimism in this respect. However, whilst the significance of the shift in the balance of political power cannot be disputed a key issue to remain is how far the resources and appropriate guidance will be made available to local authorities, already overburdened by the technical demands of air quality review and assessment, to enable genuinely inclusive and deliberative local determination.

References


Macnaghten, P., Jacobs, M., 1997. Public identi...


