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THE RELATIONSHIP BETWEEN PEDESTRIANS' ASSESSMENT OF STREET ENVIRONMENTS AND PHYSICAL CONDITIONS

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1. Introduction

1.1 Study Objectives

1.1.1 Any new road, road improvement or traffic management scheme could affect pedestrian journeys in its locality or elsewhere. Some journeys may be affected directly, with severance caused where the new road or road improvement cuts across a pedestrian route, others may be affected indirectly with a new road causing changes in traffic levels elsewhere. To enable effects on pedestrians to be given proper weight when decisions are taken, techniques are required that forecast the effects of the scheme on the number and quality of pedestrian journeys. This is particularly true in urban areas, since effects on pedestrians may be one of the main benefits or disbenefits of measures to relieve urban traffic.

1.1.2 As a first stage of research in this area, TRRL placed a contract with the Institute for Transport Studies at the University of Leeds. The terms of reference were:

i) to review literature for currently available techniques and possible approaches and for any useful and general background information on:

   a) estimating number of pedestrian journeys
   b) assessing changes in pedestrian amenity;

ii) to make recommendations as the the best (if any) currently available techniques for (a) and (b) above, taking into account the availability of any data required as inputs to the techniques;

iii) if the literature review reveals that further work is necessary in these areas, either in the development or testing of existing methods, or in the development of new methods, to make detailed proposals to carry out the necessary research.

As well as the literature review (May et al 1985) that study produced recommendations for further research (May, 1985). In 1986 TRRL commissioned the Institute for Transport Studies to conduct a research project based on those recommendations, whose detailed elements were designed to:-

1) develop sampling procedures/expansion factors for pedestrian counts;
2) identify proportions of pedestrians by type;
3) test existing models to predict pedestrian numbers and develop others if necessary;
4) develop dose-response relationships for overall nuisance and individual environmental effects;
5) explore evidence among residents of trip suppression and diversion in response to environmental conditions.

This report deals with objective (4). In more detail, this required the identification of the factors which appear to influence the perception of amenity; the collection of physical data on the levels of those factors; and interviews with

pedestrians to determine their response to those factors. The intention was to identify thresholds above which particular factors gave rise to concern over amenity, and to check these against the tentative thresholds suggested in the literature review (May et al, 1985). This in turn would permit the identification of times of day and locations where pedestrian amenity issues should be considered.

1.2 Study Reports

Other reports based on this study provide an update to the original literature review (Turvey, 1987); a description of the survey design (Hopkinson et al, 1987a); and the results of work on items (1) and (2) (Turvey et al, 1987); item (3) (May et al, 1987); and item (5) (Hopkinson et al, 1987b).

1.3 Study Method

The study method, which was developed by TRRL and modified during the proposal stage for the study, is described in full elsewhere (Hopkinson et al, 1987a). In brief it involved the selection of 15 centres, in five categories of three each. Of each set of three, one was to be set aside for validation purposes. The centres are listed in Table 1 and sketch plans of each location are included in Appendix 1.

The study programme involved the following fieldwork:

(1) manual classified counts of pedestrians;
(2) video data collection for pedestrian numbers and traffic flows;
(3) on-street pedestrian interviews;
(4) household interviews;
(5) noise and pollution monitoring;
(6) observation of site characteristics.

Of these items (1)-(3) and (6) were collected at all centres; items (4) and (5) were collected at two and three sites respectively as indicated in Table 1.

Table 1

Study Locations for On-Street Interviews and Pedestrian Counts

Type	Centre 1	Centre 2	Validation Centre
Large urban active	Manchester*	Aberdeen	Bristol
Large urban depressed	Lewisham*	Sheffield	Coventry
Small urban historic	Lanark**	Winchester	Guildford
Small urban other	Chesterfield	Kilmarnock	Epsom
District Centre	Hebden Bridge*	Twickenham	Hazel Grove**

* Pollution Studies
** Household Interviews

2. Pedestrian Data

2.1 Data Format

The project specification asked for 500 interviews of pedestrians in each of 15 centres; this requirement was later relaxed to 400 in the light of problems with weather, lighting and pedestrian flows at some sites, and in one or two cases a smaller sample of 300 had to be accepted. The interview sample was drawn randomly throughout the 0900-1700 survey period, by approaching the third person after the completion of each interview. Interviews were initially held on three days at each site in October and November 1986. Where a sufficient sample had not been obtained then, further interviews were conducted in February and March 1987.

The interview structure was based on the repertory grid technique, using three streets in each centre to represent the elements which were compared with one another; interviews only took place in one street. The survey design is described fully in Hopkinson et al, 1987a. In one centre, Hazel Grove, it proved difficult for respondents to distinguish the three elements, which formed separate lengths of the sole shopping street. The repertory grid part of the survey was therefore not conducted at that site. As a result, information has been obtained for 15 interview streets and 28 comparison streets (two at each of 14 sites), giving 43 streets in total.

The environmental factors, or constructs, on which the survey was

based were determined from earlier work in Manchester (Hopkinson, 1987), and are shown in Table 2. A seven point numeric scale was used for all attitudinal questions to provide an approach which was compatible with that adopted in other studies by the Transport and Road Research Laboratory. A score of 1 represented the worst, and 7 the best conditions for each construct. The twelve constructs were used to rate each of the three streets in each centre. In addition, respondents were asked to assess their general reactions to the interview street on the same seven point scale.

Table 2

Constructs Used in the Repertory Grid

Shops and buildings attractive	(7)	- Shops and buildings unattractive	(1)
Pavements crowded for pedestrians	(1)	- Plenty of room on pavements for pedestrians	(7)
Traffic noisy in this street	(1)	- Traffic not noisy in this street	(7)
Safe crossing this street	(7)	- Not safe crossing this street	(1)
Traffic fumes a problem	(1)	- Traffic fumes not a problem	(7)
Pavements in good condition	(7)	- Pavements in poor condition	(1)
Easy street to cross	(7)	- Difficult street to cross	(1)
Feel safe from traffic when on pavement	(7)	- Don't feel safe from traffic when on pavement	(1)
Parked vehicles cause obstructions	(1)	- Parked vehicles no problem	(7)
Amount of traffic too much	(1)	- Amount of traffic about right	(7)
Shops interesting	(7)	- Shops uninteresting	(1)
Street I like to visit	(7)	- Street I don't like to visit	(1)

(1) = Score for 'bad' pole (7) = Score for 'good' pole

Information was obtained on a number of personal and journey details which it was thought might influence attitudes, under three broad classifications:

1) Current Journey

- journey purpose
- origin of walk journey
- method of travel to centre
- duration of walk journey

2) Journey Familiarity

- usual time of visit to three streets
- usual frequency of visits to three streets
- number of years coming to centre

3) Personal Details

- age
- sex
- walking ability
- walking situation

The interview form used is included as Appendix 2. The basis on which it was developed and applied is described in detail in Hopkinson et al (1987a).

2.2 Representativeness of the Sample

The data collected on age and sex of respondents permitted an initial check to be made of the representativeness of the interview sample, since it could be compared with that obtained from the manual counts. Manual counts were conducted for four 20-minute periods on each of the three survey days, as described in Turvey et al (1987). Observers estimated the age of all pedestrians crossing a screenline across the pavement. These were categorised into three broad bands: over under 18, 18-65 and over 65. The same observers were employed to interview, and made the same assessment for interviewees.

Table 3 summarises the results of the screenline sample counts, and Table 4 the categorisation of the interviewees. Table 5 indicates the absolute differences in the percentages of pedestrians recorded. Generally the interview sample contained similar proportions of men and women to those observed in the sample counts; the most substantial differences were in Hebden Bridge, Lewisham and Hazel Grove, in each of which men were under-sampled in the interview. Generally the young were under-represented in the interview sample; this was to be expected, since interviewers were encouraged to obtain adults' perceptions. In the majority of centres there was a tendency to compensate by over-sampling the elderly. Thus if any biases have been incorporated into the sample they have been to focus more on the views of the elderly and, in some centres, women.

Table 3

Manual Count Classification of Pedestrians By Site

Site	Males (%) All	<18 Yrs	18-65 Yrs	>65 Yrs	Females (%) All	<18 Yrs	18-65 Yrs	>65 Yrs
01 Chesterfield	36	7	23	6	64	11	38	15
02 Sheffield	35	9	20	6	65	12	43	10
03 Lanark	38	12	21	5	62	8	49	5
04 Hebden Bridge	46	9	32	5	54	7	43	4
05 Kilmarnock	37	6	27	4	63	12	47	4
06 Aberdeen	44	5	38	1	56	5	50	1
07 Lewisham	45	5	31	9	55	5	41	9
08 Epsom	43	5	27	11	57	9	38	10
09 Winchester	46	6	34	6	54	7	43	4
10 Guildford	35	4	24	7	65	5	50	10
11 Twickenham	45	4	34	7	55	6	41	8
12 Bristol	38	5	30	3	62	7	52	3
13 Manchester	42	7	32	3	58	9	44	5
14 Coventry	47	12	24	11	53	7	34	12
15 Hazel Grove	39	8	22	9	61	6	42	13

2.3 Other Pedestrian Characteristics

Table 6 presents data on the main purpose of respondents' journeys. Generally, as might be expected from a survey in shopping streets, 60% or more of the journeys were for shopping or shopping from work. The only centres where this was not so were Hebden Bridge (54%), Winchester (41%), Twickenham (44%) and Coventry (52%). In all these cases work and personal business trips were significant; so, in two cases, were leisure trips. This reflects in part the nature of the streets chosen and in part the characteristics of the centre. The other point of interest is the high percentage of 'other' trips in Winchester; these were predominantly pedestrians passing through en route to the centre.

Table 7 indicates the mode used to travel to the centre. The most common modes were car, bus and walking; in Manchester and Guildford train was also a significant mode, and in Aberdeen 9% came by coach. Walking was particularly substantial, at 40% or more of the total, in the smaller centres of Lanark, Hebden Bridge, Twickenham and Hazel Grove. Bus use exceeded 40% in Chesterfield, Aberdeen (with coach), Lewisham, Bristol, Manchester and Coventry, and was virtually 80% in Sheffield, where the interview street was a major bus stopping point. Car use (as driver or passenger) exceeded 40% in Chesterfield, Kilmarnock, Epsom, Winchester, Guildford and Hazel Grove.

Table 4

Classification of Interviewed Sample by Age, Sex

	Site	Male All	Male <18 Yrs	Male (%) 18-65 Yrs	Male >65 Yrs	Female All	Female <18 Yrs	Female (%) 18-65 Yrs	Female >65 Yrs
01	Chesterfield	37	3	27	7	63	5	51	7
02	Sheffield	36	6	27	3	64	18	40	6
03	Lanark	37	4	22	11	63	4	49	10
04	Hebden Bridge	34	2	28	4	66	2	54	10
05	Kilmarnock	38	2	29	7	62	3	52	7
06	Aberdeen	42	5	33	4	58	6	48	4
07	Lewisham	36	2	28	6	64	3	48	13
08	Epsom	42	5	27	10	58	5	45	8
09	Winchester	45	4	32	9	55	3	43	9
10	Guildford	35	5	21	9	65	5	47	13
11	Twickenham	45	2	36	7	55	6	40	9
12	Bristol	36	3	26	7	64	6	49	9
13	Manchester	47	4	39	4	53	7	44	2
14	Coventry	48	4	39	5	52	5	41	6
15	Hazel Grove	32	1	22	9	68	3	52	13

Table 5

Difference Between Percentage Distributions in Interview Sample and Classified Manual Counts By Site (Absolute)

Site	Males				Females			
	All	<18 Yrs	18-65 Yrs	>65 Yrs	All	<18 Yrs	18-65 Yrs	>65 Yrs
01 Chesterfield	+ 1	- 4	+ 4	+ 1	- 1	- 6	+12	- 8
02 Sheffield	+ 1	- 3	+ 8	- 3	- 1	+ 6	- 2	- 4
03 Lanark	- 1	- 8	+ 1	+ 6	+ 1	- 4	0	+ 5
04 Hebden Bridge	-12	- 7	- 4	- 1	+12	- 5	+11	+ 6
05 Kilmarnock	+ 1	- 4	+ 2	+ 3	- 1	- 9	+ 5	+ 3
06 Aberdeen	- 2	0	- 5	+ 3	- 1	+ 1	- 3	+ 1
07 Lewisham	- 9	- 3	- 3	- 3	+ 9	- 2	+ 7	+ 4
08 Epsom	- 1	0	0	- 1	+ 1	- 4	+ 7	- 2
09 Winchester	- 1	- 2	- 2	+ 3	+ 1	- 4	- 1	+ 5
10 Guildford	0	+ 1	- 3	+ 2	- 6	0	- 3	+ 3
11 Twickenham	0	- 2	+ 2	0	0	0	- 1	+ 1
12 Bristol	- 2	- 2	- 4	+ 4	+ 2	- 1	- 3	+ 6
13 Manchester	+ 5	- 3	+ 7	+ 1	- 5	- 2	0	- 3
14 Coventry	+ 1	- 8	+15	- 6	- 1	- 2	+ 6	- 6
15 Hazel Grove	- 7	- 7	0	0	+ 7	- 3	+10	0

Table 6

Journey Purpose of Respondents by Site

(Percentage of Respondents by Site)

Site Name	Shop	Shop/ Work	To/From Work	Part Work	Pers. Bus.	To/From School	Meet Friend	Leisure	Day Visit	Other	n=
01 Chesterfield	67	6	4	<1	13	3	2	2	<1	<1	441
02 Sheffield	72	1	7	1	6	3	5	2	1	2	470
03 Lanark	59	2	11	2	12	2	5	5	3	<1	304
04 Hebden Bridge	52	2	12	3	10	<1	2	10	5	4	392
05 Kilmarnock	73	1	9	2	7	<1	1	6.	<1	<1	297
06 Aberdeen	64	2	10	3	6	6	3	5	1	<1	444
07 Lewisham	77	2	5	3	5	1	3	2	1	<1	354
08 Epsom	58	3	14	6	10	3	1	3	1	<1	367
09 Winchester	35	6	11	3	16	3	1	3	<1	22	314
10 Guildford	71	4	7	3	6	4	2	<1	<1	<1	441
11 Twickenham	39	5	8	10	17	8	2	11	1	<1	302
12 Bristol	67	5	4	4	6	1	3	3	<1	2	364
13 Manchester	68	3	12	1	3	4	6	2	1	<1	450
14 Coventry	44	8	13	1	17	7	4	5	<1	<1	408
15 Hazel Grove	69	3	9	3	12	<1	1	1	<1	<1	452
Min	35	1	4	<1	3	<1	1	1	<1	<1	
Max	77	8	14	10	17	8	6	11	5	22	

Table 8 indicates the time spent walking in the centre. Aberdeen, Lewisham, Guildford, Bristol and Coventry are notable for the high proportion spending two hours or more walking. Even some of the smaller centres have substantial proportions of people spending long periods walking, and only Kilmarnock, Twickenham and Manchester have large proportions of short journeys. Pedestrians will on average have been exposed to the environmental conditions in the centre for almost two hours.

Table 9 indicates the frequency of visit and the number of years for which the respondent had been visiting the centre. The results show a surprising level of habituation, with respondents at seven of the sites having been visiting on average for 20 years or more, and 20% or more visiting every day at seven sites. Lanark and Hebden Bridge had particularly high proportions of daily visitors. Conversely, Lewisham, Bristol and Manchester were notable for the high proportion of first time visitors, and Manchester for the low average number of years' experience of the centre. Despite the timing of the autumn surveys, 85% or more of the respondents reported that their current frequency of visit was typical, except in Bristol, where the figure fell to 70%.

Table 10 presents data on walking ability and situation as observed by the interviewer. In all cases, 90% or more of respondents had no observable restriction on walking ability; Lewisham, Epsom, Guildford, Twickenham and Bristol had the highest percentages of people with observed or stated problems.

The percentage of respondents unencumbered differed substantially between sites. At Chesterfield, Epsom, Guildford and Bristol only around half were. At most other sites between 75% and 85% were. The main differences were in the numbers carrying shopping (defined as one or more bags) although Lanark, Winchester and Twickenham had much smaller percentages of respondents with children.

2.4 Comparison of 1986 and 1987 Data

As noted in Section 2.1, some additional interview data had to be collected at six sites to reach the target number of interviews. These interviews were conducted in the early spring of 1987, and it was thought that the interview sample might be different from that observed in the pre-Christmas main surveys. Table 11 compares the interview samples for the sites concerned in terms of age, sex and percentage on shopping trips. There were few differences in age, the most noticeable being in Lewisham where the percentage of young respondents increased, and in Guildford, where the percentage of elderly respondents fell. The split between men and women was generally similar. The most substantial differences were in the percentage of shopping trips, which were considerably lower in Lanark and Epsom, and higher in Twickenham. Overall, however, there appears to be no reason for not treating the two data sets as one.

Table 7

Method of Travel to Centre on Day of Interview

(% Respondents)

	Car Driver	Car Pass.	Bus	Coach	Train	Taxi	Cycle	Motor Cycle	Walked
01 Chesterfield	34	12	42	<1	<1	<1	<1	<1	11
02 Sheffield	9	5	79	<1	1	<1	<1	<1	6
03 Lanark	25	11	20	<1	2	1	<1	<1	40
04 Hebden Bridge	22	5	14	<1	2	<1	<1	<1	53
05 Kilmarnock	28	13	38	<1	<1	<1	<1	<1	20
06 Aberdeen	21	12	39	9	1	<1	<1	<1	17
07 Lewisham	23	10	45	1	1	<1	1	<1	17
08 Epsom	43	9	12	1	4	1	4	<1	28
09 Winchester	50	10	8	<1	2	<1	2	2	26
10 Guildford	36	10	24	<1	12	<1	1	1	16
11 Twickenham	26	3	23	<1	2	<1	2	0	43
12 Bristol	25	15	44	1	2	<1	1	1	9
13 Manchester	22	6	41	2	<1	1	1	0	5
14 Coventry	18	6	51	<1	<1	<1	<1	1	23
15 Hazel Grove	37	4	10	<1	1	<1	1	<1	47

Table 8

Length of Time Spent Walking in Centre in Minutes

(% of Respondents)

	<10	10-30	30-60	60-120	>120	Average
01 Chesterfield	8	15	19	28	30	117
02 Sheffield	16	9	16	27	32	108
03 Lanark	29	35	4	13	11	63
04 Hebden Bridge	23	24	7	17	27	88
05 Kilmarnock	45	13	13	15	14	57
06 Aberdeen	7	16	2	17	48	173
07 Lewisham	3	14	4	11	59	167
08 Epsom	8	21	16	28	27	103
09 Winchester	29	22	5	22	22	85
10 Guildford	19	13	3	2	52	152
11 Twickenham	32	37	15	11	4	40
12 Bristol	4	5	2	1	88	261
13 Manchester	74	13	2	1	7	40
14 Coventry	16	22	4	1	61	133
15 Hazel Grove	12	36	5	26	21	84

Table 9

(a) Frequency of Visit to Interview Street in Past 2 Weeks

(% Respondents)

Site		1st Time	1-2 Days	3-5 Days	6-11 Days	Every Day
01	Chesterfield	13	23	27	19	17
02	Sheffield	16	25	28	17	12
03	Lanark	6	16	17	17	43
04	Hebden Bridge	14	14	18	19	32
05	Kilmarnock	9	18	30	18	24
06	Aberdeen	15	19	24	16	24
07	Lewisham	20	25	25	15	12
08	Epsom	11	22	24	27	15
09	Winchester	7	16	21	28	27
10	Guildford	17	28	26	19	9
11	Twickenham	9	17	24	26	22
12	Bristol	32	26	21	15	6
13	Manchester	24	35	17	14	8
14	Coventry	10	22	21	28	17
15	Hazel Grove	8	19	23	30	20

(b) Number of Years Coming to Each Centre

(% Respondents)

Site		< 1	2-5	5-10	> 10	Mean Years Per Respondent
01	Chesterfield	1	5	14	79	26
02	Sheffield	2	10	12	76	21
03	Lanark	3	16	15	65	22
04	Hebden Bridge	2	17	20	61	22
05	Kilmarnock	1	10	12	76	27
06	Aberdeen	5	16	21	48	17
07	Lewisham	5	20	18	57	16
08	Epsom	9	22	15	54	15
09	Winchester	7	25	20	48	16
10	Guildford	4	21	18	58	17
11	Twickenham	13	28	17	42	14
12	Bristol	2	16	16	66	21
13	Manchester	5	26	19	50	8
14	Coventry	3	10	15	72	20
15	Hazel Grove	3	14	19	64	19

Table 10

(a) Classification of Respondents by Walk Ability

(% of Respondents)

Site		Fully Able	Walking Stick	Wheel-Chair	Walking Difficulty	Stated Health Problem
01	Chesterfield	95	1	1	3	2
02	Sheffield	98	1	1	1	1
03	Lanark	92	2	1	2	1
04	Hebden Bridge	95	2	0	2	1
05	Kilmarnock	97	2	1	1	1
06	Aberdeen	98	1	1	1	1
07	Lewisham	90	4	1	3	2
08	Epsom	92	3	1	3	2
09	Winchester	96	3	1	1	1
10	Guildford	94	2	1	2	1
11	Twickenham	92	1	1	5	1
12	Bristol	94	3	1	2	1
13	Manchester	98	1	1	1	1
14	Coventry	98	1	1	1	1
15	Hazel Grove	98	1	1	1	1

(b) Percentages of Respondents Encumbered

Site		Unen-cumbered	Child in Pushchair	With Child Walking	With More One Child	With Shopping	With Luggage/ Bicycle
01	Chesterfield	53	6	7	1	32	1
02	Sheffield	64	9	8	2	17	<1
03	Lanark	84	4	2	1	8	1
04	Hebden Bridge	76	7	7	3	7	<1
05	Kilmarnock	76	5	5	2	12	<1
06	Aberdeen	70	4	7	2	17	<1
07	Lewisham	65	8	5	<1	20	<1
08	Epsom	54	6	4	1	31	4
09	Winchester	84	3	2	<1	10	<1
10	Guildford	50	7	3	<1	32	2
11	Twickenham	72	3	1	<1	20	4
12	Bristol	48	7	4	<1	39	2
13	Manchester	82	2	5	1	9	<1
14	Coventry	87	5	2	<1	4	<1
15	Hazel Grove	81	11	4	1	2	<1

Table 11

Comparison of 1987 and 1986 Interview Data by Age, Sex and Main Journey Purpose

(% of Respondents)

Location	1987 Survey						1986 Survey					
	Age			Sex		Main Journey	Age			Sex		Main Journey
	<18	18-65	>65	M	F	Shopping	<18	18-65	>65	M	F	Shopping
03												
Lanark	3	75	22	36	64	40	8	71	21	38	52	64
04												
Hebden Bridge	3	74	22	33	67	54	4	79	17	33	67	53
07												
Lewisham	12	68	21	36	64	73	5	77	18	38	52	75
08												
Epsom	11	74	14	42	57	53	10	72	18	44	56	63
10												
Guildford	10	74	16	35	64	74	14	65	21	35	65	70
11												
Twickenham	8	77	14	47	53	45	9	71	17	46	54	35

2.5 Distribution of Interviews by Time of Day

Table 12 indicates the distribution of interviews by time of day at the 15 sites. For comparison, Table 13 presents the flows of pedestrians along pavements from the video surveys. As Turvey et al, (1987) noted elsewhere, these follow three broad types of distribution; ones in which a pronounced midday peak separates morning and afternoon flow rates of similar magnitude; ones in which the midday peak is followed by afternoon flows which are higher than those in the morning; and ones in which there is little variation in flow throughout the day. Table 12 also shows the distribution of interviews in these time periods.

In the main the distribution of interviews do not follow this pattern; interview rates are if anything lower in the longer midday period than in the morning, and the rate in the afternoon is also lower than that in the morning. This will need to be borne in mind in comparing responses by time of day.

Table 12

Percentage of Interviews in Time Period
(All Respondents; All Days)

Location	<0930	0930-1130	1130-1400	1400-1530	1530-1700	0920-1150	1150-1440	1440-1650
01 Chesterfield	5	35	23	20	17	35	34	31
02 Sheffield	14	30	23	18	16	34	34	32
03 Lanark	8	27	26	21	17	29	40	31
04 Hebden Bridge	5	35	28	21	10	38	39	23
05 Kilmarnock	7	30	28	18	17	33	39	28
06 Aberdeen	9	30	23	27	21	33	44	23
07 Lewisham	0	55	20	16	3	55	30	15
08 Epsom	5	38	30	21	9	40	42	18
09 Winchester	8	35	26	20	11	39	39	22
10 Guildford	7	36	28	25	6	39	46	15
11 Twickenham	5	30	27	25	13	32	32	36
12 Bristol	7	40	18	19	16	41	28	31
13 Manchester	9	31	20	21	17	34	30	36
14 Coventry	8	34	28	24	6	38	40	22
15 Hazel Grove	6	39	25	18	13	41	37	12

Table 13

Pavement Flows by Site and Analysis Period (Video Data)

Site		Day	Analysis Periods 0920-1150	1150-1440	1440-1650	Total 0920-1650
01	Chesterfield	SAT	3402	3240	2298	8941
		MON	718	2190	991	3900
02	Sheffield	FRI	12281	19282	9505	41068
		SAT	10245	14894	11199	36338
03	Lanark	MON	700	993	243	1936
04	Hebden Bridge	THU	444	603	376	1424
		FRI	447	626	416	1489
05	Kilmarnock	FRI	748	2452	1321	4521
06	Aberdeen	SAT	5824	9405	6377	21586
07	Lewisham	THU	306	2665	1569	4540
08	Epsom	MON	2572	3269	1975	7816
09	Winchester	WED	730	1543	493	2766
10	Guildford	FRI	3235	4539	1872	9646
11	Twickenham	TUE	638	1153	208	1995
12	Bristol	THU	2541	5799	1322	9662
13	Manchester	THU	1206	5075	2939	9220
		FRI	1426	5556	1836	8818
14	Coventry	MON	1501	968	443	2912
15	Hazel Grove	THU	730	1471	493	2694

3. Environmental Factors

3.1 Exposure Indices

Table 2 indicated the twelve constructs used to describe the pedestrian's environment. It can be expected that, either individualy or in combination, assessment of these will be related to certain physical characteristics of the street, its traffic and its pedestrian activity. Several potential explanatory variables can be identified for each of these types of characteristic. Because the study was concerned with traffic-related issues, no attempt has been made to explain responses in terms of the physical characteristics of the street, but a series of traffic- and pedestrian-related variables have been identified, as outlined in Section 3.2.

It is not clear whether the respondent judges the street based on conditions at the time of the interview, at the most usual time of visiting it, or in general. To test this, respondents were asked to specify, within the following time bands, the time at which they usually visited the interview street:

before 0830	1400 - 1530
0830 - 0930	1530 - 1700
0930 - 1130	after 1700
1130 - 1400	varies

The response 'varies' was taken to imply that reactions could only be compared with data for the day as a whole.

Comparison with these responses required the analysis of the individual characteristics for the interview streets for these times of day. Sections 3.3 and 3.4 present this data.

In the repertory grid section of the interview, respondents were asked to compare three streets, and the analysis of these responses (in Chapter 5) requires a knowledge of the conditions in the comparison streets. Less detailed information was obtained for these streets, but its basis is outlined in Sections 3.5 and 3.6.

3.2 Types of Exposure Index

Traffic Flow

The most basic traffic-related variable was flow itself. Flow was obtained from the video record for two days at each of the interview streets. For one day the full record was counted in five minute intervals; for the second a five minute count was made every fifteen minutes. At some sites the video record was not complete, and flows were expanded pro-rata for the analysis periods concerned. For the comparison streets, flow estimates were obtained from local authorities. While the former could be categorised by time of day, the local authority data tended to be for a variety of time periods.

Traffic Composition

It is well known that different types of vehicle give rise to

different levels of environmental intrusion and are perceived in different ways. The most commonly distinguished vehicles are cars, buses and commercial vehicles of different sizes. In addition, motorcycles are often singled out for criticism, but it was judged that these were unlikely to be a significant factor in shopping streets.

For the interview streets, flow was classified into five categories:

(1) Cars
(2) Buses
(3) Light Goods Vehicles
(4) Medium Goods Vehicles
(5) Heavy Goods Vehicles

The first two categories are self apparent but (3) to (5) were defined as follows:

Light Goods Vehicles

Under 7.5 tons gross weight
2 axles, single rear tyres
e.g. Escort van, Astra van, Transit, Bedford

Medium Goods Vehicles

7.5 - 16.0 tons gross weight
2 axles, double rear tyres
rigid body
e.g. Luton type vehicle and larger (rear reflector plates)

Heavy Goods Vehicle (HGV)

Over 16.0 tons gross weight
3+ axles
rigid or articulated

On occasion the number of tyres was not evident from the video; in these cases comparison was made with other vehicles of the same type.

In practice, goods vehicles were defined as the combination of medium and heavy goods vehicles for further analysis.

For the comparison streets, local authority data was again used where available, usually for the day as a whole. The video data for the survey street was, however, recorded for separate time periods.

Traffic Congestion

Speed of traffic, and particularly the amount of acceleration and deceleration are likely to influence perceptions of the environment. It had originally been intended that queue lengths would be measured from the video as indicators of level of congestion, but it was realised that the length of road within the field of view was not necessarily sufficient to monitor all the types of queue which might influence perceptions of the

environment. Problems arose particularly where the field of view included a junction where queues habitually occurred, or where the main causes of queues, such as controlled crossings, were outside the field of view. Instead it was decided to use volume/capacity ratios as an indicator of the level of congestion (see Appendix 3). This was done for the interview streets, but not for the comparison streets.

Noise

The three parameters above all influence noise levels, and could be taken as proxies for noise levels. Noise levels are related in part to the logarithm of traffic flow, and this was also used as a potential explanatory variable. As an alternative, kerbside noise levels for the interview streets were calculated directly, using standard procedures (DoE, 1975). Because many of the streets did not exhibit free flow conditions, it was anticipated that the calculated noise levels might be inaccurate. As an alternative, noise levels were measured directly at three sites (see Table 1).

Pollution

Similarly, the three traffic parameters could be expected to act as proxies for pollution levels. In addition, carbon monoxide levels at the kerbside were estimated for the interview streets using TRRL's simplified procedure (Waterfield and Hickman, 1982). Once again these were checked at three sites against direct measurements of carbon monoxide levels.

Other Traffic Variables

Although some of the constructs were related to safety and parking, it was decided not to attempt to measure these; the former because actual accident levels do not necessarily correlate with sense of danger, and the latter because parked vehicles within the field of view of the video were not necessarily a suitable indicator of overall parking levels.

Pedestrian Crowding

It was anticipated that concern over crowding would be most closely correlated with pavement concentrations (ie pedestrians per square metre). These had been calculated for the interview streets in another part of the project (Turvey et al 1987). No such data was available for the comparison streets, and instead flow per unit width of pavement was used as an indicator.

3.3 Traffic Characterisitcs of Interview Streets

Traffic Flow

Table 14 indicates the mean hourly traffic flows for the individual sites for the video survey days. The variation in flow by time of day is also shown for at least one day at each site. Overall flows varied little from day to day, the largest difference being 14% at Lewisham. Flow regimes varied considerably, with Hazel Grove having the highest flow at 2,100 veh/h, Lewisham, Epsom and Manchester with over 1,500, six sites

Table 14

Mean Hourly Vehicular Flow for Different Time Periods by Site

Site		0900-1700	0900-0930	0930-1130	1130-1400	1400-1530	1530-1700
01	Mon	55	54	64	49	46	57
Chesterfield	Sat	64	102	65	53	63	-
02	Fri	250	300	185	270	322	254
Sheffield	Sat	223	238	212	260	228	224
03	Mon	954	760	1195	729	924	1026
Lanark	Tue	854	780	850	858	949	-
04	Thu	1016	1272	1033	1009	1026	987
Hebden Bridge	Fri	1014	924	978	934	1016	1074
05	Thu	1176	1440	1063	1131	1208	-
Kilmarnock	Fri	1296	1200	1202	1303	1302	1590
06	Mon	1021	912	1013	1023	1116	-
Aberdeen	Sat	1108	900	1145	1012	1226	1192
07	Thu	1693	1776	1596	1486	1686	1749
Lewisham	Fri	1409	-	-	1306	1544	-
08	Mon	1625	1764	1589	1600	1648	1617
Epsom	Tue	1790	1464	1529	1602	-	-
09	Wed	1198	1200	1190	1120	1266	1236
Winchester	Thu	997	-	941	978	1146	-
10	Fri	347	216	401	329	360	309
Guildford	Sat	333	-	354	340	328	-
11	Tue	1005	-	1078	1014	872	-
Twickenham	Mon	995	-	1119	888	993	-
12	Thu	721	-	631	637	742	552
Bristol	Fri	707	-	644	609	362	-
13	Thu	1640					
Manchester	Fri	1628	1284	1782	1324	1800	1392
14	Tue	1107	1200	1196	1002	1232	1056
Coventry	Mon	1191	-	1266	1350	1108	-
15	Thu	2057	-	1946	1902	2242	2100
Hazel Grove	Fri	2174	-	-	2127	2176	-

in the range 1,000 to 1,500, two sites between 500 and 1,000 and three low flow sites at Guildford, Sheffield and Chesterfield, the latter having only 60 veh/h. Most sites exhibited very uniform flows throughout the day; Hebden Bridge had the most peaked traffic conditions, with the morning peak flow some 25% above the average.

Traffic Composition

Tables 15 and 16 present similar data solely for bus and goods vehicle flow, where the latter include only medium and heavy goods vehicles. Bus flows are not closely correlated with total flows; the highest is at Sheffield with 160 per hour and other high flows at Aberdeen, Lewisham and Bristol. The lowest flow, of 10 per hour, is at Hebden Bridge. As a result the percentage of total flow represented by buses varies considerably, as indicated in the summary table (Table 19), from 70% at Chesterfield and Sheffield to under 1% at Hebden Bridge. Apart from the first two sites, buses do not exceed 20% of the flow at any site.

Goods vehicle flows are more closely related to total flows. The highest is at Hazel Grove, with 300 goods veh/h; Lewisham and Coventry have around 150 veh/h. At the other end of the scale, Sheffield and Chesterfield have less than 10 per hour. Except at the lowest flow sites, Saturdays have much lower goods vehicle flows; so, on a Monday, does Coventry. As the summary table (Table 19) indicates, the percentage of goods vehicles is 10% or more at five sites on at least one day (Lanark, Hebden Bridge, Lewisham, Coventry and Hazel Grove).

Traffic Congestion

Table 17 indicates the estimated capacities for the 15 interview streets, as derived in Appendix 2, and the resulting average volume/capacity ratios which, as noted earlier, have been taken as an indictor of congestion. Four sites, Hebden Bridge, Epsom, Manchester and Hazel Grove, have ratios in excess of 0.5, with the highest at Epsom operating at over two thirds of capacity throughout the day. All the other sites are between 0.2 and 0.5, except for Chesterfield (0.03), Sheffield (0.06) and Guildford (0.10).

Table 15

Mean Hourly Bus Flow for Different Time Periods by Site

Site		0815-1730	0815-0930	0930-1130	1130-1400	1400-1530	1530-1730
01	Mon	42	36	48	43	36	38
Chesterfield	Sat	41	60	38	36	45	-
02	Fri	162	240	143	180	174	148
Sheffield	Sat	158	96	150	178	149	176
03	Mon	27	-	35	23	22	66
Lanark	Tue	16	27	14	9	16	-
04	Thu	10	12	17	9	4	3
Hebden Bridge	Fri	11	0	11	12	10	12
05	Thu	22	-	43	20	24	-
Kilmarnock	Fri	27	36	26	27	24	30
06	Mon	143	144	132	135	180	-
Aberdeen	Sat	137	132	173	123	132	99
07	Thu	119	102	90	138	106	122
Lewisham	Fri	110	-	-	-	-	-
08	Mon	36	24	31	32	44	46
Epsom	Tue	32	24	38	18	-	-
09	Wed	25	12	25	25	32	19
Winchester	Thu	33	-	31	30	16	-
10	Fri	52	54	53	57	52	36
Guildford	Sat	58	-	65	-	52	-
11	Tue	30	-	38	21	28	-
Twickenham	Mon	39	-	58	30	26	-
12	Thu	102	-	105	73	104	96
Bristol	Fri	89	-	84	84	39	-
13	Thu	50	-	43	36	56	60
Manchester	Fri	32	60	37	27	38	18
14	Tue	53	-	39	52	46	60
Coventry	Mon	39	-	30	54	48	-
15	Thu	35	-	31	37	40	12
Hazel Grove	Fri	36	-	-	54	16	-

Table 16

Mean Hourly Goods Vehicle Flow for Different Time Periods by Site

Site		0815-1730	0815-0930	0930-1130	1130-1400	1400-1530	1530-1700
01	Mon	2	0	-	3	3	0
Chesterfield	Sat	5	0				-
02	Fri	4	-	5	4	3	-
Sheffield	Sat	0	-	0	0	0	0
03	Mon	69	-	78	48	78	57
Lanark	Tue	89	60	51	72	100	-
04	Thu	98	97	116	93	84	-
Hebden Bridge	Fri	86	66	126	70	80	-
05	Thu	67	60	90	48	72	-
Kilmarnock	Fri	94	120	134	66	84	-
06	Mon	97	20	-	-	-	-
Aberdeen	Sat	53	30	59	68	52	-
07	Thu	145	150	180	94	114	-
Lewisham	Fri	142	-	-		144	-
08	Mon	58	60	40	64	64	-
Epsom	Tue	129	108	92	146	-	-
09	Wed	33	42	30	48	20	-
Winchester	Thu	43	-	43	54	12	-
10	Fri	15	20	30	0	10	10
Guildford	Sat	1	-	2	0	0	-
11	Tue	42	-	60	66	24	-
Twickenham	Mon	47	-	62	30	52	-
12	Thu	32	-	26	38	30	18
Bristol	Fri	38	-	58	48	28	-
13	Thu	42	-	60	26	36	24
Manchester	Fri	48	-	66	34	28	24
14	Tue	39					
Coventry	Mon	-		28	168	52	-
15	Thu	271	-	200	330	224	216
Hazel Grove	Fri	322	-	-	330	240	-

Table 17

Site Congestion Factors

	Site	Road Capacity (Veh/Hr)	Average Hourly (Veh/Hr)	Congestion Factor	Congestion Rank Order *
01	Chesterfield	1700	55	0.032	15
02	Sheffield	4200	250	0.060	14
03	Lanark	3200	940	0.294	10
04	Hebden Bridge	1975	1000	0.506	4
05	Kilmarnock	3450	1300	0.377	8
06	Aberdeen	2500	1020	0.408	7
07	Lewisham	3975	1650	0.415	6
08	Epsom	2350	1615	0.687	1
09	Winchester	3250	1200	0.369	9
10	Guildford	3550	347	0.098	13
11	Twickenham	2350	995	0.423	5
12	Bristol	3550	721	0.203	12
13	Manchester	2550	1600	0.628	3
14	Coventry	4200	1100	0.262	11
15	Hazel Grove	3175	2012	0.634	2

NB: Congestion Factor = $\frac{\text{Av. Hourly Flow}}{\text{Road Capacity}}$

* 1 is most congested, 15 is least congested.

Traffic Noise

Table 18 shows the mean hourly noise level in L10 dbA by site estimated from measured traffic prameters, carriageway width and pavement width. The noise levels are estimated for building facades. Only one of the sites, Chesterfield, has a mean hourly L10 less than 70dBA. Seven sites have L10 levels higher than 75dBA; Hebden Bridge is the highest at 78.5dBA.

In three cases, noise levels were measured on site to check the predictive equation used. Measured 1h L10 dBA values (with predictions in brackets) were:-

04	Hebden Bridge	76.9	(78.5)
07	Lewisham	76.1	(76.5)
13	Manchester	78.0	(75.3)

Only the Manchester value is markedly different, suggesting an underestimate using the predictive model. Generally there is no reason for suggesting that the predictive model is an unreliable estimation of facade noise levels.

Pollution

Table 18 also shows predicted mean hourly carbon monoxide (CO) concentrations at each site. In all cases CO concentrations are below 7ppm. Hazel Grove records the highest concentration at 6.94ppm.

In the same three cases, carbon monoxide levels were measured on site. Pollution measurements varied in the type of equipment used and the period observed. The results for one hour average levels (with predicted levels in brackets) were:-

04	Hebden Bridge	(1030 - 1430)	11.7	(3.65)
07	Lewisham	(1000 - 1330)	7.5	(5.76)
13	Manchester	(0830 - 1600)	5.3	(5.58)

Only the Manchester values are similar, and the observed value in Hebden Bridge is alarmingly higher than the predicted level. It seems clear that the predicted values, which use an extremely simplified method, must be treated with considerable caution.

Summary Statistics

Table 19 presents the summary data for each interview street for the following variables:

* average total hourly flow
* average hourly bus flow
* average hourly flow of medium and heavy goods vehicles
* average percentage of buses
* average percentage of medium and heavy goods vehicles
* congestion factor (volume/capacity ratio)
* logarithm of traffic flow
* noise
* carbon monoxide

The sites fall broadly into four groups. The first group (A) of low flow, low congestion sites includes Chesterfield, Sheffield and Guildford; Of these Guildford is somewhat different in having a much lower percentage of buses. The second group (B) of intermediate flow sites with low percentages of buses and goods vehicles includes Hebden Bridge, Kilmarnock, Winchester and Twickenham. The third group (C) of intermediate flow sites with high percentages of buses and goods vehicles includes Lanark, Aberdeen, Bristol and Coventry. The final group of high flow high congestion sites includes Lewisham, Epsom, Manchester and Hazel Grove.

3.4 Pedestrian Characteristics of Interview Streets

Table 20 indicates the percentage of observations of pedestrian concentration in each interview street which are at or above level of service B (0.2 pedestrians per sq. metre) as defined by Pushkarev (1976). Separate values are presented for 'real' and 'effective' concentration; the latter are the more realistic, because they omit any pavement not habitually used (Turvey et al, 1987). The sites fall into three broad groups: two high concentration sites, Guildford and Manchester, where crowding might be expected to be perceived as a problem; six further sites, Chesterfield, Sheffield, Kilmarnock, Aberdeen, Epsom and Bristol where level of service B conditions exist less frequently; and the remaining seven sites where no evidence of crowding was obtained.

Table 18

Predicted Mean Hourly L10, dBA and Carbon Monoxide (PPM) from Known Traffic Parameters

Site	Carriage-way Width (m)	Pave-ment Width (m)	Number Light Goods Vehs. (1,2)	Number Medium Goods Vehs. (1,3)	Number Heavy Goods Vehs. (1,4)	Total Mean Hrly Flow	L10 (5)	CO (6)
01	10	3	12	43	0	55	68.2	0.18
02	14	6	85	165	0	250	71.4	0.88
03	14	3	857	75	22	954	73.9	3.34
04	8	2	901	75	40	1016	78.5	3.65
05	12	3	1060	66	50	1176	75.8	4.12
06	16	4	804	200	16	1021	74.2	3.52
07	16	4	1429	247	17	1693	76.5	5.76
08	8	3	1530	84	11	1625	74.9	5.52
09	14	3	1139	56	3	1198	73.5	4.20
10	14	3	281	64	2	347	70.4	1.22
11	12	2	928	64	13	1005	75.3	3.52
12	16	5	588	122	12	721	71.9	2.45
13	16	4	1547	88	5	1640	75.3	5.58
14	14	4	902	190	15	1107	75.4	3.86
15	20	3	1764	165	128	2057	76.2	6.94

Notes:

1. Number of Vehicles per Hour (0900-1700), assumed speed 30 km/h.
2. Light Goods Vehicles = Cars, Vans, Light Goods Vehicles < 3000 kg Unladen.
3. Medium Goods Vehicles = Medium Goods Vehicles, 2 axles > 3000 kg Unladen, including buses.
4. Heavy Goods Vehicles = All Commercial Vehicles with 3 or More axles.
5. Predicted Level - Building Facade:

$$L10\ 1\ hour = 43.5 + 11.2 \log 10\ (L + 9M + 13\ H) - 0.42\ Cw - 10.2 \log 10 \left[\frac{dk + 3.5}{4.5}\right] \delta_1 + 4.6 \log 10 \left[1 + \left[\frac{dk + 3.5}{dk + 3.5 + 2\ (df - dk)}\right]^{\delta_2}\right]$$

where:
df = distances from kerb to nearside building facade
dk = distance from the kerb to the receiver
δ_1 and δ_2 are ground cover indices
$\delta_1 = 1 + 0.52\ p1$
$\delta_2 = 1 + 0.5\ p2$
p1 and p2 are the proportion of soft ground between the receiver and the kerb and the receiver and the facade. In this study these were taken to be zero. In this case the equation reduces to 4.6 log 10 [2].
p = pavement width (metres); Cw = carriageway width (metres)

(Source: Gilbert et al, 1980; TRRL SR620)

6. Predicted Mean Hourly Level (ppm) - (Source: Waterfield and Hickman, 1982).

Table 19

Summary of Traffic Flow Characteristics for Each Site

Site		Av. Hrly Veh. Fl.	Av. Hrly Bus Fl.	Av. Hrly GVs Fl.			% Bus	% GVS	V/C Ratio	Log Flow	Noise	CO	Group
				med.	heav.	total							
01	Mon	55	42	2	0	2	76	4	0.03	1.74	68.2	0.2	A
Chesterfield	Sat	64	41	5	0	5	64	8					
02	Fri	250	162	4	0	4	65	1	0.06	2.39	71.4	0.9	A
Sheffield	Sat	223	158	0	0	0	71	0					
03	Mon	954	27	47	22	69	3	7	0.29	2.97	73.9	3.3	C
Lanark	Tue	854	16	67	22	89	2	10					
04	Thu	1016	10	65	33	98	¡1	10	0.51	3.00	78.5	3.6	B
Hebden Bridge	Fri	1014	11	74	12	86	¡1	8					
05	Thu	1176	22	48	19	67	2	5	0.38	3.07	75.8	4.1	B
Kilmarnock	Fri	1296	27	44	50	94	2	8					
06	Mon	1021	143	58	16	97	14	7	0.41	3.00	74.2	3.5	C
Aberdeen	Sat	1108	137	37	16	53	12	5					
07	Thu	1693	119	128	17	145	7	8	0.42	3.22	76.5	5.8	D
Lewisham	Fri	1409	110	106	36	142	8	10					
08	Mon	1625	36	47	11	58	2	4	0.69	3.21	74.9	5.5	D
Epsom	Tue	1790	32	80	49	129	2	8					
09	Wed	1198	25	30	3	33	2	3	0.37	3.08	73.5	4.2	B
Winchester	Thu	997	33	27	16	43	3	4					
10	Fri	347	52	12	3	15	15	4	0.10	2.54	70.4	1.2	A
Guildford	Sat	333	58	1	0	1	18	1					
11	Tue	1005	30	34	8	42	3	4	0.42	3.00	75.3	3.5	B
Twickenham	Mon	997	39	34	13	47	4	5					
12	Thu	721	102	20	12	32	14	4	0.20	2.85	71.9	2.4	C
Bristol	Fri	707	89	20	18	38	13	5					
13	Thu	1640*	50	37	5	42	6	3	0.63	2.91	75.3	5.6	D
Manchester	Fri	1614*	32	38	10	48	4	3					
14	Tue	1107	53	24	15	39	5	3	0.26	3.04	75.4	3.9	C
Coventry	Mon	1191	39	33	19	52	3	4					
15	Thu	2057	35	130	124	271	2	13	0.63	3.31	76.2	6.9	D
Hazel Grove	Fri	2174	46	216	106	322	2	15					

Group: A = 500 vph B = 500 – 1500 vph, Bus + GV 10%
C = 500 – 1500 vph, Bus + GV 10% D = 1500 vph

Table 20

Percentage of Pavement Concentration Values at Level of Service B (over 0.2 pedestrians/sq metre) by Site and Analysis Period

Site		Real Concentration			Effective Concentration			Group
		0920-1150	1150-1440	1440-1650	0920-1150	1150-1440	1440-1650	
01	Chesterfield	0	0	0	33	24	10	M
02	Sheffield	0	0	1	0	8	8	M
03	Lanark	0	0	0	0	0	0	L
04	Hebden Bridge	0	0	0	0	0	0	L
05	Kilmarnock	10	15	20	12	17	28	M
06	Aberdeen	3	8	8	13	33	40	M
07	Lewisham	0	0	0	0	0	0	L
08	Epsom	11	0	0	25	13	0	M
09	Winchester	0	0	0	0	0	0	L
10	Guildford	17	23	21	50	71	34	H
11	Twickenham	0	0	0	0	0	0	L
12	Bristol	0	12	0	4	28	0	M
13	Manchester	3	37	16	14	72	50	M
14	Coventry	0	0	0	0	0	0	L
15	Hazel Grove	0	0	0	0	0	0	L

Groups: H = High; M = Medium; L = Low

3.5 Traffic Characteristics of Comparison Streets

Table 21 summarises the traffic conditions for the three streets at each location, with the data for the interview street presented first. The same broad classification of sites has been used as in Section 3.3, but in eight cases pedestrianised streets have been identified separately within the low flow group. Most locations display a considerable difference in traffic conditions between streets. The only exceptions are Chesterfield, where all are low flow sites, but one is pedestrianised and Lewisham, where all are high flow sites. Hazel Grove has no comparison streets. Of the remainder, the interview street has what appears to be the least favourable traffic conditions in Lanark, Kilmarnock, Epsom, Bristol and Manchester. In none of the sites does the interview street appear to have the most favourable traffic conditions.

3.6 Pedestrian Characteristics of Comparison Streets

Table 22 presents pedestrian flow data for the comparison streets, based on 10 minute counts at each site on three occasions on each of the three survey days. Because no concentration data was obtained, these have been converted to flows per unit width as an indicator of pavement congestion.

Table 21

Traffic Flow Characteristics in Three Streets by Location

	Location	Mean Hourly Vehicle Flow	Mean Hourly Bus Flow	Mean Hourly Goods Flow	Date of Survey	Group (*)
01	A Knifesmithgate(1)	55	42	2	Nov 86	A
	B Cavendish St(2)	26	21	2		A
	C Low Pavements	P	P	P	-	A(P)
02	A Haymarket(1)	250	162	4	Nov 86	A
	B Fargate	P	P	P	-	A(P)
	C Hole in Road	P	P	P	-	A(P)
03	A High Street	954	27	69	Nov 86	C
	B Bannatyne St(3)	471	24	43	May 83	A
	C Welgate(3)	201	2	26	May 83	A
04	A Market Street(1)	1006	10	98	Nov 86	B
	B Crown Street(4)	300	N/A	N/A	Nov 86	A
	C New Road	890	9	79	June 85	B
05	A King Street/ Titchfield St(1)	1296	27	94	Nov 86	B
	B Titchfield St(1)	400	N/A	N/A	Nov 86	A
	C King Street	P	P	P	-	A(P)
06	A Union Street(1)	1021	143	97	Nov 86	C
	B Market Street(5)	1600	N/A	N/A	July 86	D
	C St George's St(5a)	300	N/A	N/A		A
07	A Lewisham High St(1)	1693	119	145	Nov 86	D
	B Lee High Road(6)	1750	25	N/A	Nov 85	D
	C Loampit Vale(6)	2950	30	N/A	Nov 85	D
08	A High Street(1) (Market Place)	1625	32	145	Nov 86	D
	B High Street(7)	1600	30	260	May 86	D
	C Upper High St(7)	800	N/A	N/A	May 86	B
09	A St George's St(1)	1198	25	33	Nov 86	C
	B Jewry Street(8)	1100	13	11	May 86	B
	C High Street	P	P	P	-	A(P)
10	A Lower North St(1)	341	52	15	Nov 86	A
	B Upper North St(9)	900	N/A	N/A	Oct 83	B
	C High Street(10)	300	N/A	N/A	-	A
11	A York Street(1)	1005	30	42	Nov 86	B
	B King Street(11)	2400	N/A	N/A		D
	C Church Street(12)	<300	N/A	N/A	-	A
12	A Horsefair(1)	721	102	32	Nov 86	C
	B Broadmead	P	P	P	-	A(P)
	C Union Street(13)	<300	N/A	N/A	-	A
13	A Cross Street(1)	1640	50	42	Nov 86	D
	B Deansgate(14)	1400	130	160	May 86	C
	C Market Street	P	P	-	-	A(P)
14	A Corporation St(1)	1107	53	139	Nov 86	C
	B Trinity Street(15)					
	C Lower Precinct	P	P	P	-	A(P)
15	London Road(1)	2057	35	271	Nov 86	D

Group

A = <500 vph
B = 500 - 1500 vph, Bus + GV < 10%
C = 500 - 1500 vph, Bus + GV > 10%
D = > 1500 vph

Comments

(P) Pedestrianised

(1) Data from ITS video survey
(2) Estimated by City Engineer
(3) 6 hour flow count Friday 1985 (7.00-10.00; 3.00-6.00)
12 hour flow count Friday 1985 (7.00-7.00)
(4) Estimated flow, mainly cars
Peak hour flow (8.00-9.00) supplied by Calderdale
(5) Average peak (08.15-09.15) offpeak (12.00-1.00) flow
(5a) Estimated flow, mainly buses
(6) Average peak/offpeak flows taken from Lewisham town centre local plan
(7) Data from 12 hour, 5 day count Surrey County Council 07.00-07.00, Monday-Friday
(8) Manual count by ITS staff
(9) Data from Surrey County Council
(10) Estimated flow
(11) Data from Richmond Borough Council
(12) Estimated flow, mainly cars
(13) Estimated flow, mainly buses
(14) PhD survey: 4 six minute counts over 2 days
(15) Awaiting Data from Coventry City Engineers

N/A Data not available

Table 22

Average Hourly Pedestrian Flows By Location for Three Time Periods

LOCATION/STREET	0920-1150	1150-1440	1440-1650	PED FLOW/METRE WIDTH/HR
01 A KNIFESMITHGATE	2400	2080	1680	280- 400
B CAVENDISH STREET	680	480	702	80- 117
C LOW PAVEMENTS	1260	3444	2568	90- 246
02 A HAYMARKET	8800	14800	15200	730-1200
B FARGATE	1134	4620	4640	45- 185
C HOLEINROAD	1422	5220	4062	71- 261
03 A HIGH STREET	560	394	240	40- 132
B BANNATYNE STREET	684	438	132	33- 171
C WELGATE	234	546	492	58- 136
04 A MARKET STREET	354	504	400	88- 126
B CROWN STREET	702	528	582	145- 175
C NEW ROAD	204	372	708	34- 118
05 A KING STREET/TITCHFIELD SREET	598	1961	1321	100- 327
B TITCHFIELD STREET	1002	542	478	120- 250
C KING STREET	1150	1944	1160	116- 194
06 A UNION STREET	4650	7520	6400	580- 940
B MARKET STREET	537	1530	1677	90- 280
C ST GEORGE'S STREET	2505	4431	3291	420- 740
07 A HIGH STREET	-	2000	1500	187- 250
B LEE HIGH ROAD	336	708	-	56- 118
C LOAMPIT LANE	288	-	1614	48- 270
08 A HIGH STREET (MARKET PLACE)	2000	2600	1900	333- 433
B HIGH STREET	765	2700	705	88- 337
C UPPER HIGH STREET	504	1500	1332	126- 333
09 A ST GEORGE'S STREET	580	1200	500	145- 300
B JEWRY STREET	705	1500	1536	117- 256
C HIGH STREET	1200	3120	2847	100- 260
10 A LOWER NORTH STREET	2588	3600	1872	312- 600
B UPPER NORTH STREET	4443	7437	9030	740-1500
C HIGH STREET	4701	5406	6198	156- 206
11 A YORK STREET	500	920	200	500- 230
B KING STREET	1078	2150	1596	135- 270
C CHURCH STREET	210	600	186	50- 175
12 A HORSEFAIR	2000	4650	1300	130- 465
B BROADMEAD	5955	4782	-	190- 238
C UNION STREET	1320	1716	-	132- 171
13 A CROSS STREET	1000	4200	2400	165- 700
B DEANSGATE	1074	3684	2424	134- 460
C MARKET STREET	2406	3807	3933	96- 157
14 A CORPORATION STREET	1200	770	400	96- 150
B TRINITY STREET	380	520	330	65- 120
C LOWER PRECINCT	464	1636	480	31- 109
15 LONDON ROAD	580	1180	490	61- 170

4. Environmental Perceptions in the Interview Streets

4.1 Method of Analysis

The data used in this part of the analysis consisted of the ratings given by individual respondents to the twelve constructs (Table 2) as applied to the interview streets. An additional assessment was available from Q13 of the interview, which asked the respondent to assess conditions for pedestrians in the interview street; this is referred to as 'overall nuisance'. Before comparing these with one another and with the potential explanatory variables, it was necessary to decide whether to base the analysis on a measure of central tendency and, if so, which to use. Section 4.2 presents the distributions of scores for the 12 constructs over the 15 sites, and Section 4.3 compares the use of means and medians. The chosen parameters are then compared with measured site conditions to identify any counter-intuitive results in Section 4.4. Section 4.5 presents the results of regression analyses for the data set as a whole, and Section 4.6 compares the assessments of pedestrians at different times of day.

4.2 Distributions of Ratings

Earlier work using similar constructs in a pilot study in Manchester had shown that the distributions of ratings obtained were in most cases normally distributed (Hopkinson, 1987). A similar test was conducted of the 180 separate distributions obtained in this study, using the Kolmogorov-Smirnov test and tests for kurtosis and skewness. The results for the K-S test are presented in Table 23. They indicate that in the majority of cases the ditributions are non-normal. This is borne out by inspection of the distributions, as shown in Figures 1 to 13.

Table 24 provides broad descriptions of the distributions obtained. The only constructs for which any normal distributions occur are attractiveness of shops, crowding, condition of pavements, fumes, the interest of shops and overall desire to visit. Interestingly virtually all of these are unrelated to traffic. The remainder exhibit either a fairly uniform distribution, or one which is skewed towards one pole. Most constructs have more sites skewed towards the 'bad' pole; those for which this is particularly marked are noise, safety, ease of crossing and overall traffic. The only constructs with more sites biased towards the 'good' pole are fear of traffic and desire to visit. Sites with substantially more 'bad' scores than 'good' are Sheffield, Kilmarnock, Epsom, Winchester, Bristol, Manchester, Coventry and Hazel Grove. The only site where the reverse is true is Chesterfield.

While non-normality is most likely to be caused by real differences between sites, it might be due to something intrinsic in the survey instrument, by differences in performance between interviewers, or by the underlying characteristics of the sample population. The first of these explanations seems unlikely, given the results of the earlier work in Manchester. The second was tested by comparing the results for different interviewers at sample sites. As Table 25 indicates, only one of the five sites showed substantial differences.

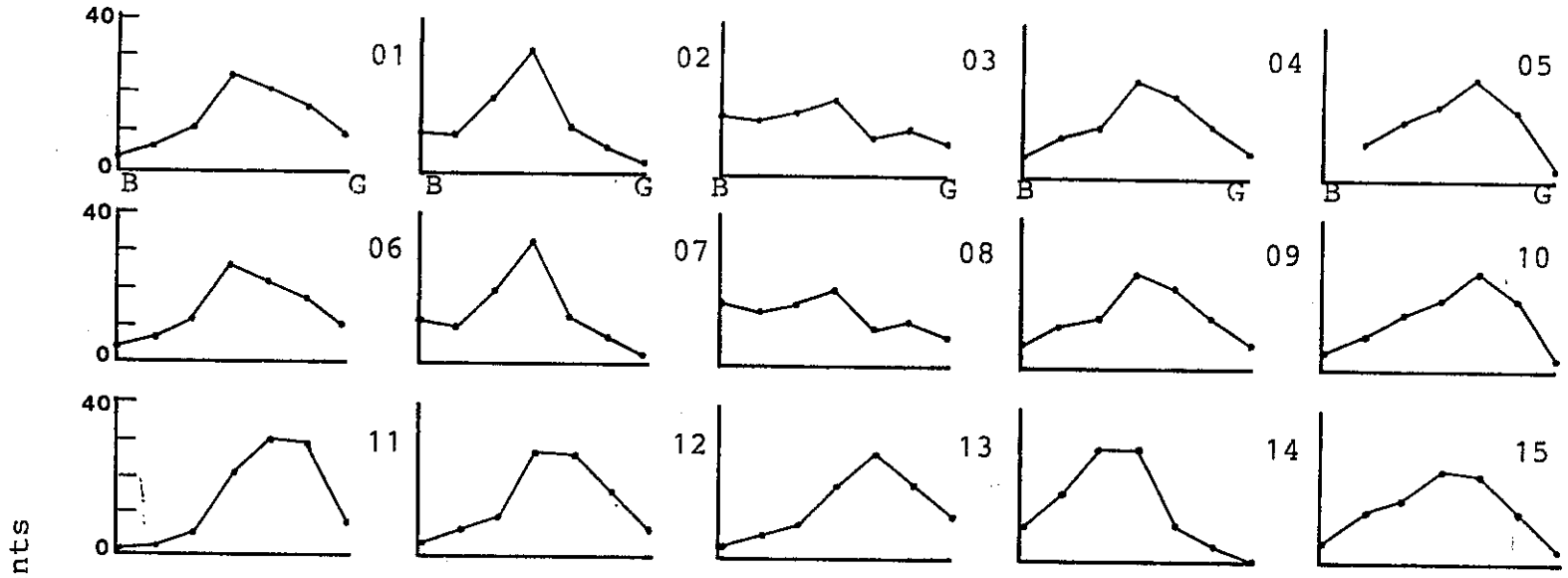


Figure 1:
Distribution of Response Scores:
Shops/Buildings Attractiveness

B = Unfavourable Rating
G = Favourable Rating

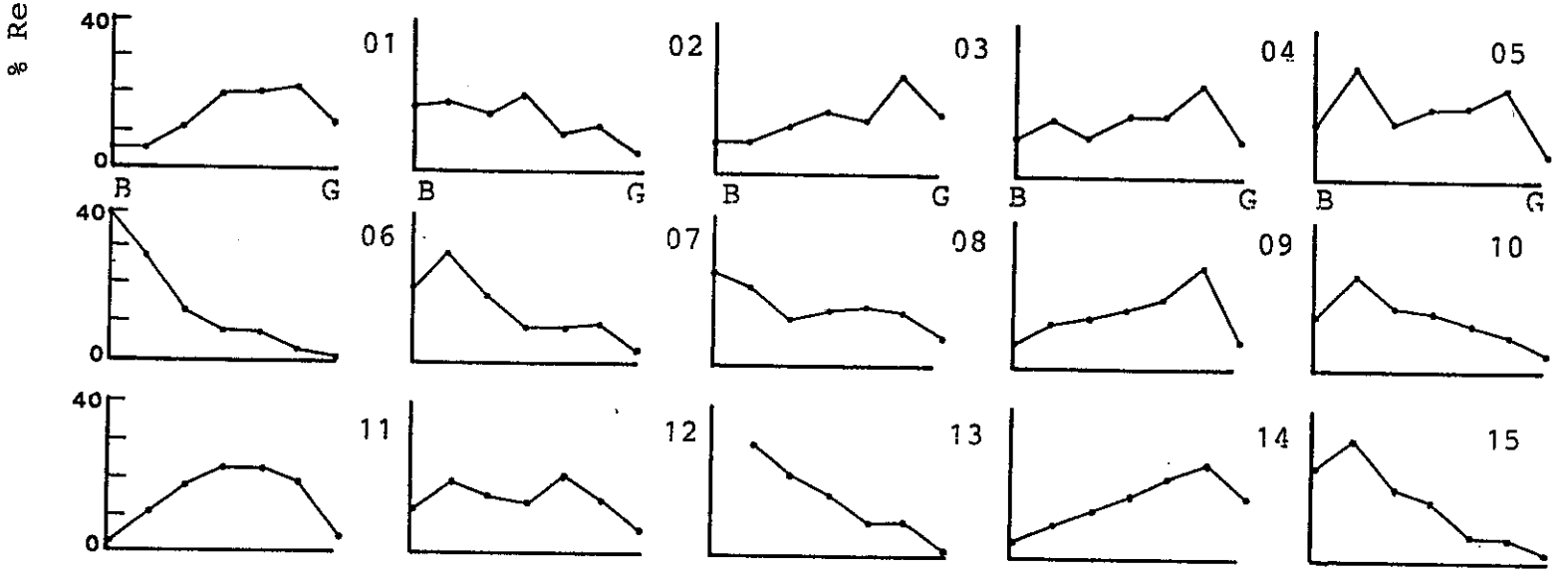


Figure 2:
Distribution of Response Scores:
Crowds

B = Unfavourable Rating
G = Favourable Rating

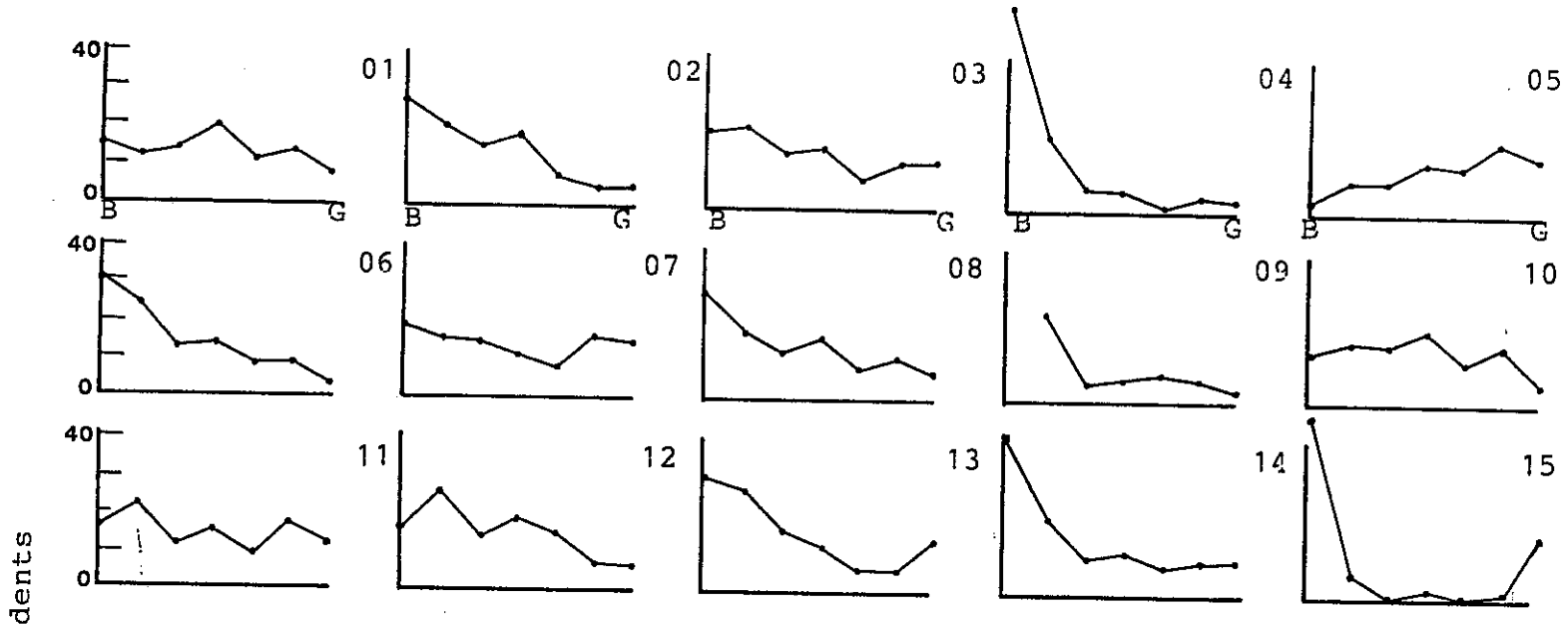


Figure 3:
Distribution of Response Scores:
Noise

B =Unfavourable Ratings
G =Favourable Ratings

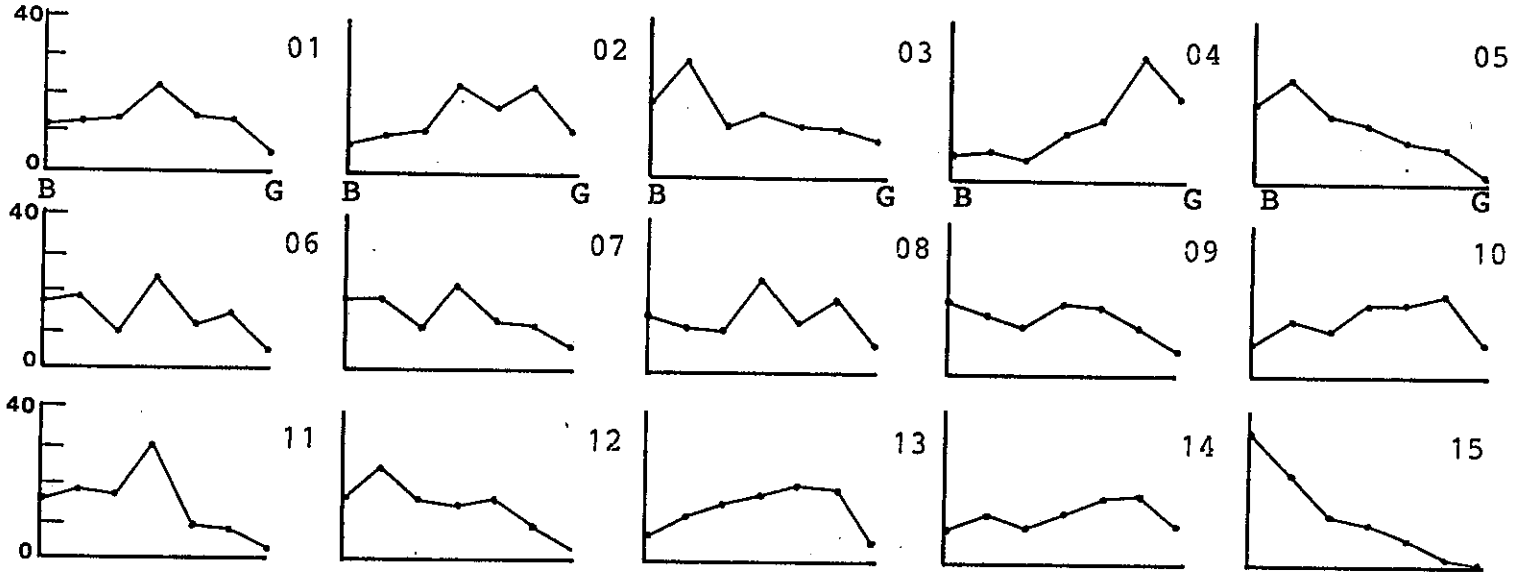


Figure 4:
Distribution of Response Scores:
Pavements

B =Unfavourable Ratings
G =Favourable Ratings

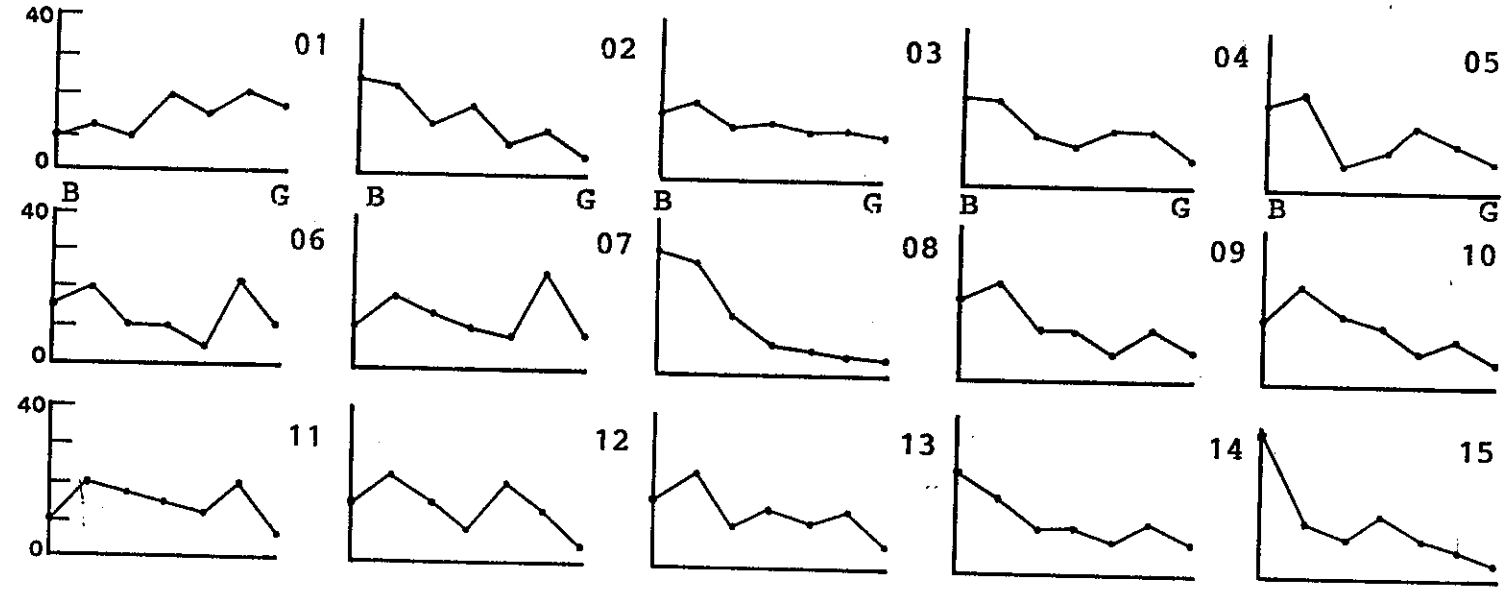


Figure 5:
Distribution of Response Scores:
Safety

B = Unfavourable Ratings
G = Favourable Ratings

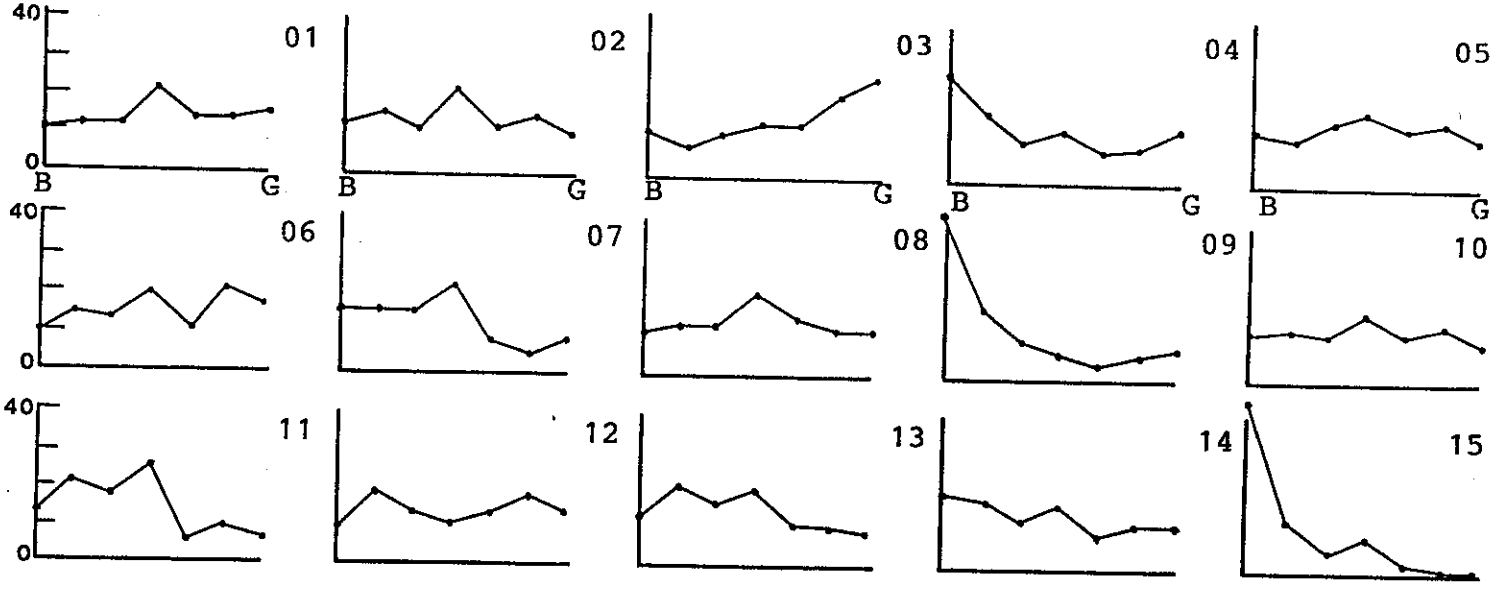


Figure 6:
Distribution of Response Scores:
Fumes

B = Unfavourable Ratings
G = Favourable Ratings

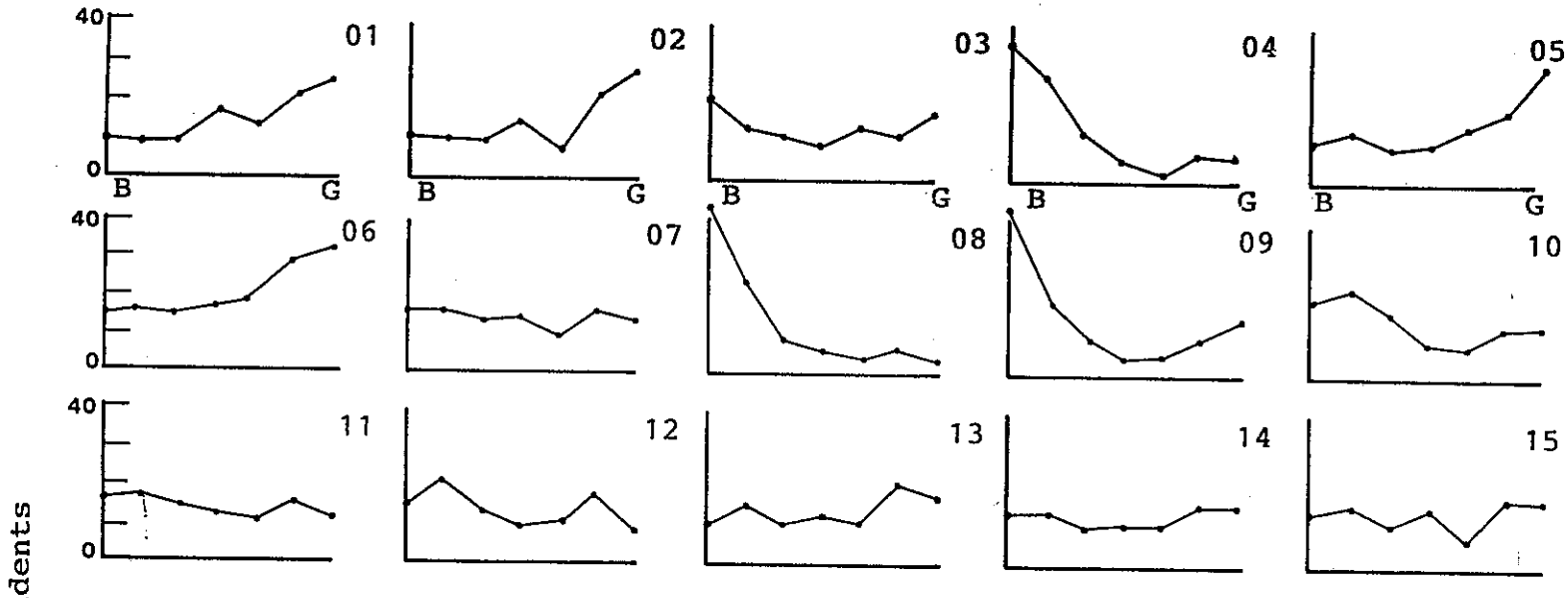


Figure 7:
Distribution of Response Scores:
Parked Vehicles

B = Unfavourable Ratings
G = Favourable Ratings

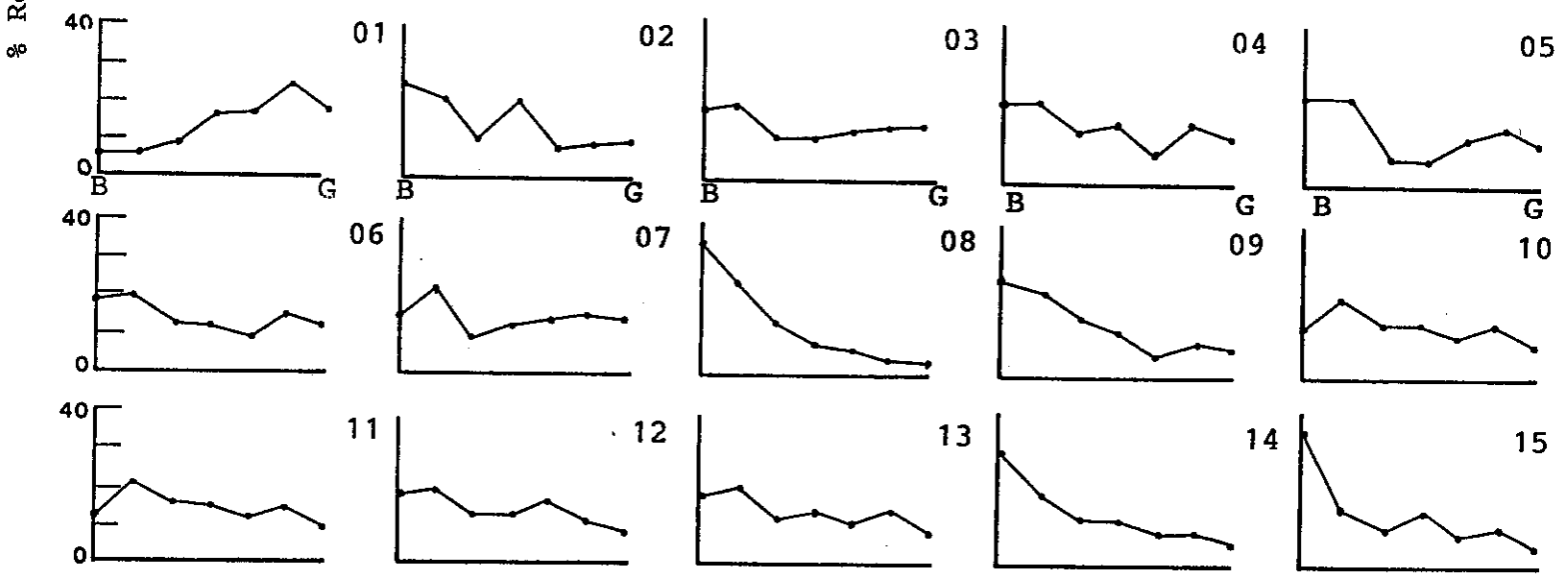


Figure 8:
Distribution of Response Scores:
Ease of Crossing

B = Unfavourable Ratings
G = Favourable Ratings

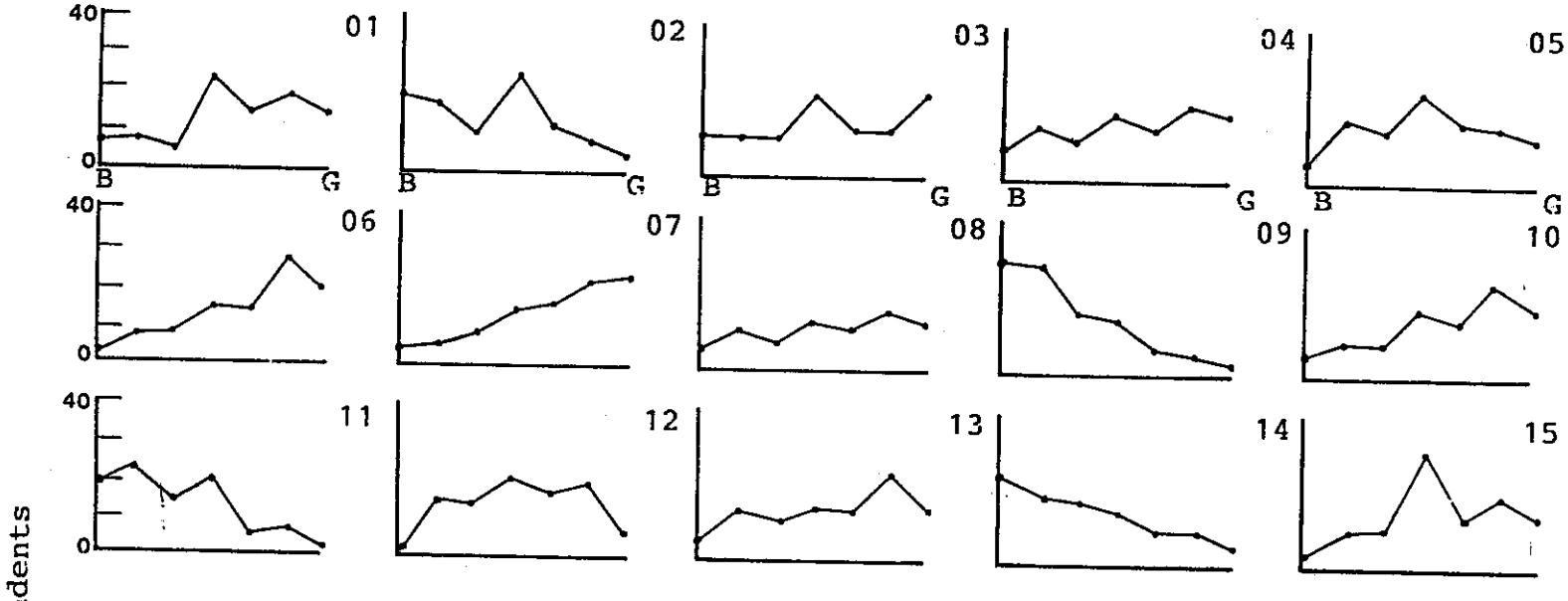


Figure 9:
Distribution of Response Scores:
Shops Interesting

B = Unfavourable Ratings
G = Favourable Ratings

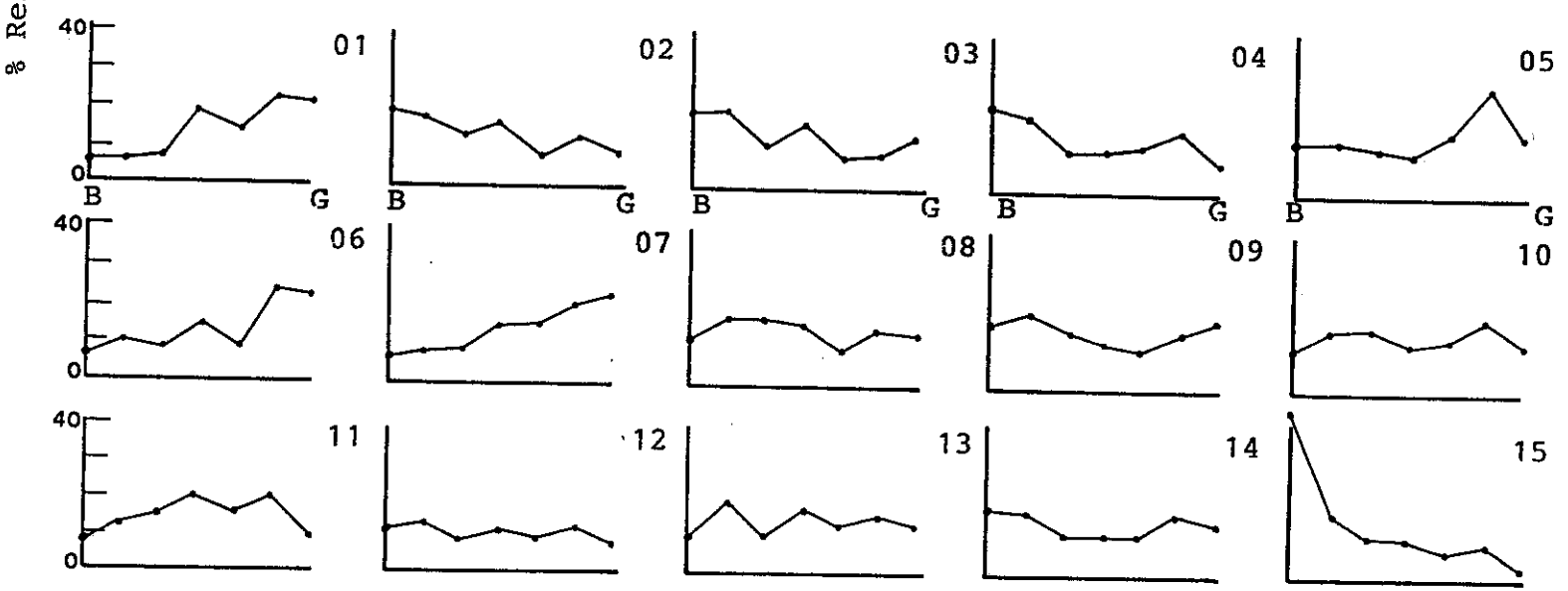


Figure 10:
Distribution of Response Scores
Fear

B = Unfavourable Ratings
G = Favourable Ratings

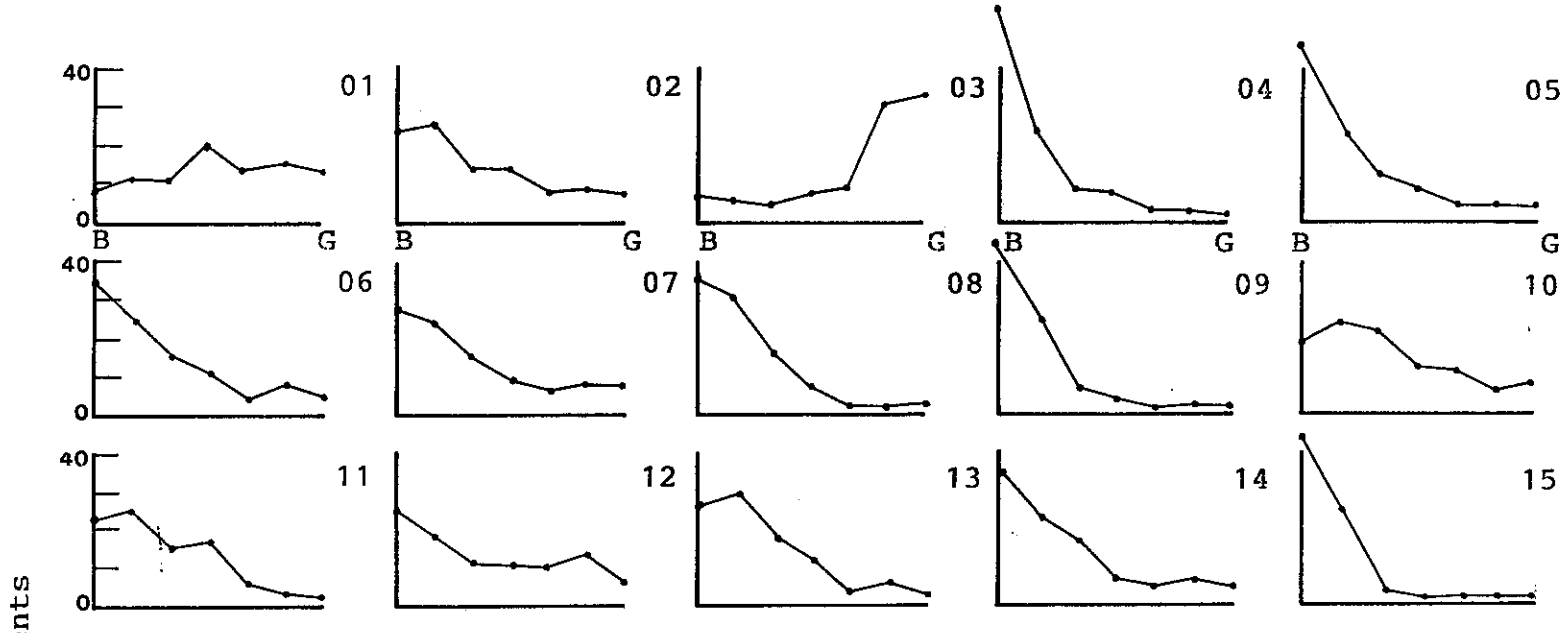


Figure 11:
Distribution of Response Scores:
Amount of Traffic

B = Unfavourable Ratings
G = Favourable Ratings

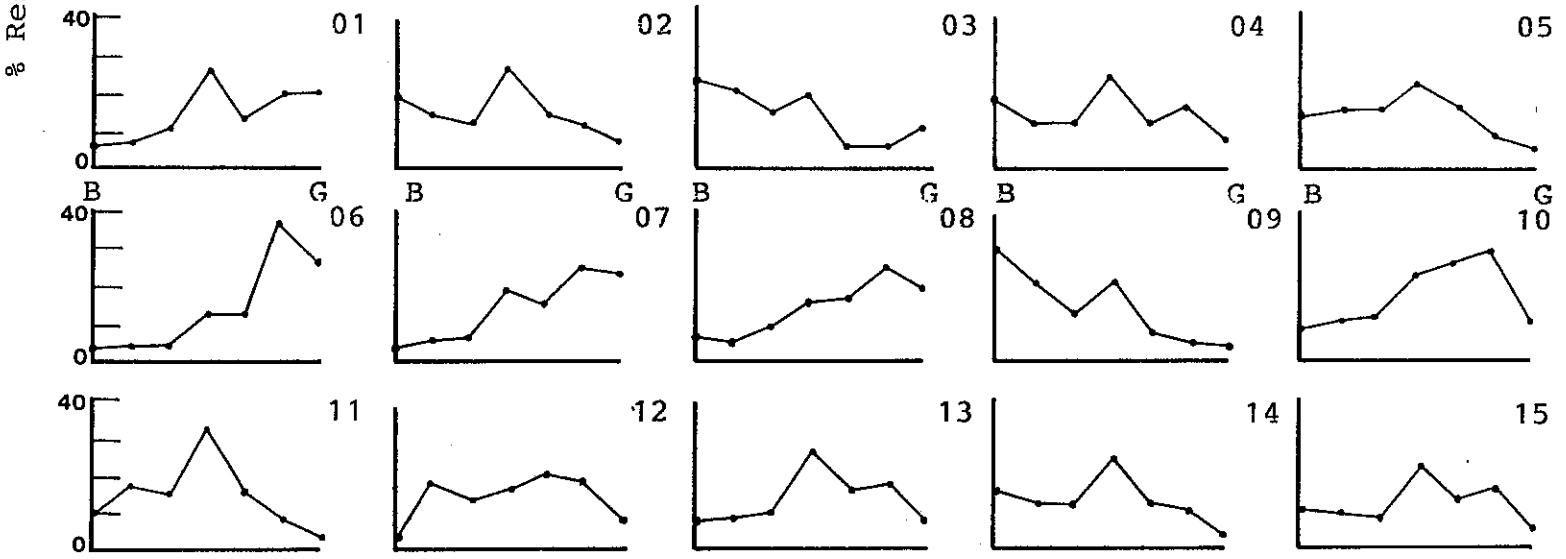


Figure 12:
Distribution of Response Scores:
Like to Visit

B = Unfavourable Ratings
G = Favourable Ratings

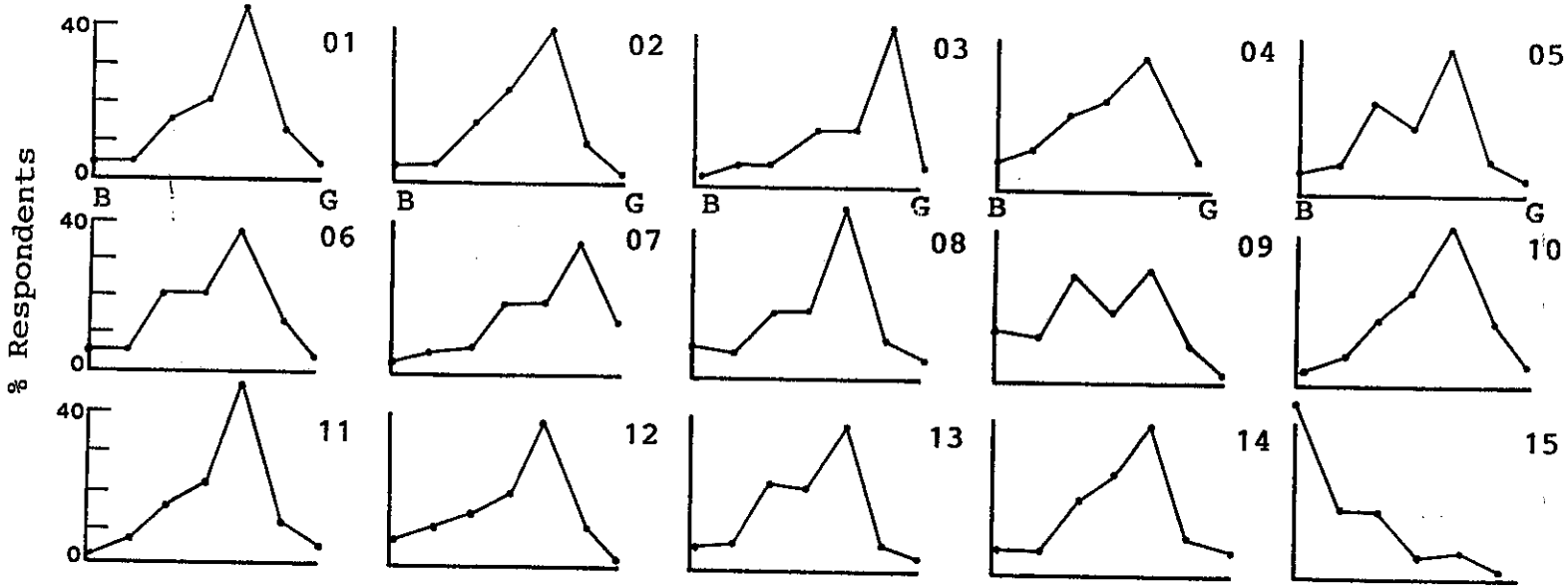


Figure 13:
Distribution of Response Scores:
Overall Nuisance

B = Unfavourable Ratings
G = Favourable Ratings

Table 23

Test for Normality of Rating Distributions for Each Construct at Each Site (Kolmogorov-Smirnov D Statistic)

Location	Sample Size	Constructs 1	2	3	4	5	6	7	8	9	10	11	12	13
Chesterfield	466	0.14	0.15	0.12	0.14	0.16	0.12	0.19	0.19	0.15	0.18	0.14	0.16	0.25
Sheffield	471	0.17	0.15	0.19	0.14	0.20	0.13	0.22	0.20	0.16	0.16	0.20	0.16	0.23
Lanark	298	0.12	0.18	0.19	0.17	0.16	0.19	0.16	0.18	0.17	0.18	0.28	0.18	0.25
Hebden Bridge	393	0.15	0.16	0.32	0.23	0.20	0.19	0.27	0.18	0.17	0.18	0.28	0.13	0.19
Kilmarnock	297	0.18	0.21	0.24	0.21	0.22	0.12	0.19	0.22	0.12	0.19	0.24	0.12	0.21
Aberdeen	444	0.25	0.22	0.16	0.18	0.17	0.26	0.16	0.22	0.22	0.23	0.26	0.22	0.18
Lewisham	365	0.21	0.16	0.17	0.19	0.13	0.14	0.18	0.18	0.18	0.22	0.17	0.20	0.15
Epsom	367	0.18	0.27	0.18	0.25	0.24	0.14	0.28	0.23	0.22	0.15	0.25	0.18	0.25
Winchester	304	0.15	0.16	0.29	0.14	0.20	0.24	0.26	0.20	0.22	0.16	0.29	0.19	0.18
Guildford	441	0.14	0.18	0.13	0.13	0.18	0.13	0.19	0.16	0.19	0.18	0.19	0.15	0.19
Twickenham	302	0.16	0.15	0.19	0.17	0.15	0.15	0.16	0.16	0.19	0.14	0.20	0.18	0.27
Bristol	362	0.17	0.16	0.19	0.18	0.17	0.15	0.18	0.17	0.13	0.19	0.19	0.15	0.24
Manchester	452	0.13	0.19	0.24	0.15	0.19	0.15	0.19	0.17	0.18	0.15	0.23	0.15	0.21
Coventry	408	0.17	0.16	0.24	0.14	0.20	0.15	0.19	0.20	0.17	0.17	0.22	0.15	0.22
Hazel Grove	442	0.19	0.23	0.25	0.26	0.24	0.24	0.26	0.18	0.24	0.24	0.23	0.26	0.22

Note: (1) The D statistic assesses the difference between the cumulative distribution and that for a normal distribution with the same mean and standard deviation.

(2) Values of D> 0.12 (N = 300); 0.10 (N = 400); 0.09 (N = 500) are non- normal.

Constructs

1 = Shops attractiveness
2 = Pavements crowded
3 = Noise from traffic
4 = Pavement quality
5 = Safety when crossing
6 = Traffic fumes
7 = Parked vehicles
8 = Ease of crossing the road
9 = Shops interesting
10 = Fear of traffic
11 = Amount of traffic
12 = Like to visit
13 = Overall nuisance

Table 24

Broad Patterns of Distribution of Constructs for Each Site

Site	Construct 1	2	3	4	5	6	7	8	9	10	11	12	13
01 Chesterfield	N	N	U	N	U	N	G	G	N	G	U	N	N
02 Sheffield	N	U	B	N	B	N	G	B	N	U	B	N	N
03 Lanark	N	G	U	B	U	G	U	U	N	U	G	B	G
04 Hebden Bridge	N	G	B	G	U	B	B	U	U	U	B	N	N
05 Kilmarnock	N	B	U	B	B	U	G	B	N	G	B	N	N
06 Aberdeen	N	B	B	U	U	U	G	U	G	G	B	G	N
07 Lewisham	N	B	U	U	U	N	U	U	G	G	B	G	G
08 Epsom	N	B	B	U	B	N	B	B	U	U	B	G	N
09 Winchester	N	G	B	U	B	B	B	B	B	U	B	G	N
10 Guildford	N	B	U	U	B	U	B	U	G	U	B	G	N
11 Twickenham	N	N	U	N	U	N	U	U	B	U	B	N	N
12 Bristol	N	N	B	B	U	U	U	U	N	U	B	U	N
13 Manchester	N	B	B	U	B	U	U	U	G	U	B	N	N
14 Coventry	N	G	B	U	B	U	U	B	B	U	B	N	N
15 Hazel Grove	N	B	B	B	B	B	U	B	N	B	B	N	B

Key

N = normal or near normal
G = skewed to 'good' pole
B = skewed to 'bad' pole
U = uniform

Constructs

1 = shops attractive
2 = pavements crowded
3 = noise from traffic
4 = pavement quality
5 = safety when crossing
6 = traffic fumes
7 = parked vehicles
8 = ease of crossing road
9 = shops interesting
10 = fear of traffic
11 = amount of traffic
12 = like to visit
13 = overall nuisance

Table 25

Comparison of Distribution of Ratings by Interviewer

(Kolmorgovrov Smirnov Test)

Location	Interviewer						
	1/2	1/3	1/4	1/5	2/3	2/4	2/5
01 Chesterfield	0	2	1	2	1	1	1
04 Hebden Bridge	0	1	1	2	0	0	0
10 Guildford	3	1	3	2	2	2	1
12 Bristol	3	6	9	1	7	8	4
13 Manchester	1	2	2	1	2	0	1

Numbers show number of constructs showing significant differences between interviewers.

The third was checked by comparing responses for pedestrians by age, sex and journey purpose. The Kolmogorov-Smirnov test was used to compare distributions for each construct at each site; Table 26 indicates those for which significant differences were obtained. Very few significant differences were identified; the most frequent was for condition of pavements, and most of the others listed are also unrelated to traffic. It must be concluded therefore that the distributions of rating are characteristic of the sample population within each of these categories.

4.3 Comparison of Means and Medians

While the non-normality of the data sets makes it impossible to draw comparisons using statistical tests which assume normality, it is still possible to use either the mean or the median as a basis of comparison, provided that the implications of the underlying distributions are also borne in mind. Grigg (1981) argues that whilst the variability of the median as a measure of central tendency of a normal distribution is about 25% greater than the variability of the means, the mean is more affected by outlying observations than the median. Accordingly he suggests that it may not be appropriate to calculate mean scores for distributions which depart markedly from the normal, or are greatly skewed, and that the median will be a more representative measure of central tendency than the mean for such skewed distributions. However, he also found that, for seven point numeric scales, the difference between the mean and median was unlikely to exceed half of a scale unit, provided that sample sizes of greater than 30 are used.

The comparison of the means and medians for each of the constructs in each location are broadly consistent with Grigg's work. Table 27 presents the mean and median values for the overall distributions for each construct at each site. The range for each parameter over each construct is also shown. The medians have a higher range for each construct but because of the nature of the data are less discriminating between sites. Overall, three quarters of the mean and median values are within 0.5 of one another, and the remainder within 1.0. On this basis it was decided to employ medians throughout for further analysis.

The statistical analysis package used (SPSSX) only produced integer medians from individual integer ratings. It was decided to test the use of interpolated medians using a manual linear interpolation. Table 28 indicates the values obtained for the two constructs, total traffic and overall nuisance, for which tests were made. Comparisons were made between the multiple regression equations obtained for these constructs using the two sets of median values. In both cases, as indicated in section 4.5, the interpolated medians produced equations with similar or somewhat lower correlation coefficients and with the same dominant explanatory variables. It was decided in the light of these results only to use integer medians in further analysis.

Table 26

Comparison of Distribution of Individuals' Ratings of Constructs in Interview Streets by Personal Characteristics

Location		Age	Sex
01	Chesterfield	none	none
02	Sheffield	none	none
03	Lanark	pavements; shops; like to visit	pavements
04	Hebden Bridge	fumes	pavements
05	Kilmarnock	none	none
06	Aberdeen	none; like to visit	none
07	Lewisham	pavements; shops	pavements
08	Epsom	pavements	none
09	Winchester	none	none
10	Guildford	like to visit	none
11	Twickenham	pavements	none
12	Bristol	none	ease of crossing
13	Manchester	none	none
14	Coventry	none	none
15	Hazel Grove	none	none

Comparison of Rating Distribution Journey Purpose

Site		Shop/Work	Shop/Personal Business	Shop/Leisure
01	Chesterfield	none	none	none
02	Sheffield	like to visit	none	noise
03	Lanark	none	none	none
04	Hebden Bridge	none	none	none
05	Kilmarnock	none	none	none
06	Aberdeen	none	none	none
07	Lewisham	none	none	none
08	Epsom	none	none	none
09	Winchester	none	none	none
10	Guildford	none	none	none
11	Twickenham	none	none	none
12	Bristol	none	none	none
13	Manchester	none	none	none
14	Coventry	none	fear; noise	none
15	Hazel Grove	none	traffic	none

Columns showing constructs which had significantly different distributions against different pedestrian and journey characteristics.

Table 27

Comparison of Mean and Median Rating Scores for Attributes by Site (All Respondents)

Site		Shop (1)	Crowds	Noise	Pavement Quality	Safety	Fumes	Parking	Ease of Crossing	Shops (2)	Fear	Amount of Traffic	Like to Visit	Overall Nuisance
01	MD	5.0*	5.0*	4.0	4.0	5.0*	4.0	5.0	5.0*	5.0	5.0*	4.0*	5.0	5.0*
Chesterfield	MN	4.5	4.6	3.8	3.8	4.5*	4.1	4.7	4.9*	4.5	4.9	4.4*	4.7	4.5
02	MD	4.0	3.0	3.0	4.0	3.0	4.0	5.0	3.0	4.0	3.0	3.0	4.0	5.0*
Sheffield	MN	3.7	3.5	2.9	4.4	3.1	4.1	4.2	3.2	3.4	3.5	3.2	3.3	4.4
03	MD	4.0	5.0*	5.0*	3.0	4.0	5.0*	4.0	5.0*	4.0	5.0*	2.0	5.0	5.0*
Lanark	MN	3.6	4.6	4.5*	3.6	3.8	4.8*	4.1	4.3	4.4	4.6	2.8	4.7	4.0
04	MD	4.0	4.0	1.0	6.0*	3.0	3.0	2.0	3.0	5.0	3.0	1.0	4.0	4.0
Hebden Bridge	MN	4.3	4.2	1.9	5.0*	3.3	3.3	2.8	3.6	4.5	2.5	2.0	4.2	4.0
05	MD	4.0	3.0	2.0	3.0	3.0	4.0	5.0	3.0	4.0	5.0*	2.0	4.0	4.0
Kilmarnock	MN	4.2	3.3	2.9	3.0	3.4	4.0	4.7	3.6	4.1	4.4	2.4	3.7	4.1
06	MD	5.0*	2.0	2.0	4.0	3.0	4.0	6.0*	4.0	6.0*	5.0*	2.0	6.0*	5.0*
Aberdeen	MN	5.0*	2.3	2.9	3.5	2.9	4.3	5.2*	3.8	5.0*	4.7	2.8	5.4*	4.2
07	MD	5.0*	2.5	4.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0*	2.0	5.0	5.0*
Lewisham	MN	4.5	3.0	3.8	4.9	3.9	3.7	3.9	3.9	4.9	4.8	2.9	5.1	4.2
08	MD	5.0*	4.0	3.0	4.0	2.0	4.0	2.0	2.0	6.0*	4.0	2.0	5.0	4.0
Epsom	MN	4.7	3.7	3.1	3.9	2.5	3.9	2.4	2.6	4.9	4.0	2.2	4.9	3.7
09	MD	3.0	5.0*	1.0	4.0	3.0	2.0	2.0	2.0	2.0	4.0	1.0	3.0	4.0
Winchester	MN	3.3	4.3	2.2	3.6	2.4	2.7	3.0	2.1	2.6	3.9	1.0	2.9	3.6
10	MD	4.0	3.0	4.0	4.0	3.0	4.0	3.0	3.0	5.0	4.0	3.0	4.0	5.0*
Guildford	MN	4.0	3.2	3.7	4.1	3.4	4.0	3.5	3.7	4.8	4.1	3.2	4.2	4.7*
11	MD	4.0	4.0	4.0	3.5	4.0	3.0	4.0	4.0	3.0	4.0	2.0	4.0	5.0*
Twickenham	MN	3.5	4.2	3.7	3.3	3.9	3.4	3.7	3.7	3.0	4.2	2.8	3.6	4.3
12	MD	4.0	4.0	3.0	5.0	2.0	4.0	3.0	3.5	4.0	5.0*	3.0	4.0	5.0*
Bristol	MN	4.3	3.8	3.3	4.7	2.7	4.1	2.7	3.3	4.2	4.1	3.3	4.3	4.1
13	MD	4.0	3.0	2.0	4.0	3.0	3.0	5.0	3.0	5.0	4.0	2.0	4.0	4.0
Manchester	MN	4.2	3.0	2.5	4.1	3.5	3.6	4.4	3.6	4.5	4.0	2.7	4.2	4.0
14	MD	4.0	5.0*	2.0	4.0	3.0	3.0	5.0	3.0	3.0	4.0	2.0	4.0	5.0*
Coventry	MN	3.6	4.7	2.8	4.2	3.3	3.6	4.4	3.1	3.1	3.8	2.8	3.5	4.3
15	MD	4.0	2.0	1.0	2.0	3.0	1.0	4.0	3.0	4.0	2.0	1.0	4.0	1.0
Hazel Grove	MN	3.8	2.7	1.1	2.5	2.9	2.0	3.1	3.1	4.4	2.6	1.0	4.0	2.3
MD Max		5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0	6.0	5.0	4.0	6.0	5.0
Min		3.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	1.0	3.0	1.0
MN Max		5.0	4.7	4.5	5.0	4.5	4.8	5.2	4.9	5.0	5.0	4.4	5.4	4.7
Min		3.3	2.3	1.1	2.5	2.4	2.0	2.4	2.1	2.6	2.5	1.0	2.9	2.9

= lowest score(s) * = highest score(s)
MD = Median MN = Mean

4.4 Initial Comparison of Medians

Table 29 lists the sites in the traffic-related categories identified in Section 3.3, and also reproduces the crowding categories identified in Section 3.4. For each traffic-related construct, it then highlights those sites which attract the highest and lowest median scores.

For the specific construct of crowds, it would be expected that the closest association would be with the level of pedestrian concentration. In practice, the sites which score poorly have medium or low levels of concentration. Concentration does not seem to be as good a determinant as traffic levels of attitudes to crowding.

For the traffic and land-use related constructs it might be expected that the high flow sites would have the lowest scores. To an extent this occurs; Hazel Grove receives the lowest score on six constructs, and

Table 28

Interpolated and Integer Medians

Location	Total Traffic		Overall Nuisance	
	Interpolated Median	Integer Median	Interpolated Median	Integer Median
01 Chesterfield	3.9	4.0	4.3	5.0
02 Sheffield	2.2	3.0	5.5	5.0
03 Lanark	1.4	2.0	4.2	5.0
04 Hebden Bridge	1.0	1.0	3.7	4.0
05 Kilmarnock	1.3	2.0	3.9	4.0
06 Aberdeen	1.8	2.0	4.1	5.0
07 Lewisham	1.8	2.0	5.2	5.0
08 Epsom	1.4	2.0	3.7	4.0
09 Winchester	0.9	1.0	3.1	4.0
10 Guildford	2.2	3.0	4.3	5.0
11 Twickenham	2.0	2.0	4.1	5.0
12 Bristol	2.4	3.0	5.5	5.0
13 Manchester	1.8	2.0	3.7	4.0
14 Coventry	1.7	2.0	5.0	5.0
15 Hazel Grove	0.5	1.0	0.9	1.0

Epsom on three; conversely Chesterfield obtains the highest score on five constructs. However, Winchester stands out as performing less well than might have been expected, and Lanark, Aberdeen and Lewisham as scoring better. Among individual constructs parking and like to visit do not appear to follow the pattern of ratings across sites which might have been expected suggesting that they may not be traffic-related.

4.5 Relationships between Ratings and Traffic Parameters for All Respondents

Table 30 presents the results of a simple linear regression of median scores for each traffic-related construct in turn against

Table 29

Sites with Highest and Lowest Median Scores for Individual Traffic Related Constructs

Classification of Location		Construct									
		Crowds	Noise	Safety	Fumes	Parking	Ease of Crossing	Fear	Amount of Traffic	Like to Visit	Overall Nuisance
Traffic Flow (1)	Crowding (2)										
Group A											
Chesterfield	M	o					o	o	o		o
Sheffield	M										
Guildford	H									o	
Group B											
Hebden Bridge	L		x			x					
Kilmarnock	M							o			
Winchester	L		x				x		x	x	
Twickenham	L					x					o
Group C											
Lanark	L	o	o	o	o		o	o			
Aberdeen	M	x				o		o		o	o
Bristol	M			x							o
Coventry	L	o									o
Group D											
Manchester	H										
Lewisham	L							o			o
Epsom	M			x		x	x				
Hazel Grove	L	x	x		x			x	x		x

o Denotes location scored highest on attribute
x Denotes location scored lowest on attribute

1 See Table 19
2 See Table 20

Table 30

Simple Linear Regression Coefficients for Individual Constructs Against Different Explanatory Variables

	Construct									
	2	3	5	6	7	8	10	11	12	13
TOTF	0.10	0.16	0.06	0.23	0.10	0.12	0.11	0.57	0.10	0.42
BUSF	0.22	0.02	0.02	0.10	0.20	0.01	0.02	0.05	0.14	0.13
GDSF	0.15	0.14	0.07	0.31	0.01	0.04	0.19	0.46	0.01	0.46
MGDF	0.05	0.08	<0.01	0.15	<0.01	<0.01	0.05	0.28	0.01	0.14
HGDF	0.18	0.20	0.01	0.33	<0.01	<0.01	0.05	0.28	0.01	0.76
BUS%	<0.01	0.09	0.17	0.08	0.14	0.10	<0.01	0.60	0.04	0.09
GDS%	0.04	0.03	0.01	<0.01	0.10	0.08	0.12	0.11	0.20	0.07
LOGF	0.10	0.17	0.23	0.13	0.05	0.15	0.04	0.69	0.01	0.09
PCON	0.20	<0.01	0.05	0.08	0.17	0.01	<0.01	0.11	<0.01	0.15
TCON	0.13	0.06	0.09	0.14	<0.01	0.11	0.01	0.11	<0.01	0.15

Constructs

1 = shops attractive
2 = pavements crowded
3 = noise from traffic
4 = pavement quality
5 = safety when crossing
6 = traffic fumes
7 = parked vehicles
8 = ease of crossing road
9 = shops interesting
10 = fear of traffic
11 = amount of traffic
12 = like to visit
13 = overall nuisance

Variables (See Tables 19, 22)

TOTF = Average Hourly Vehicular Flow
BUSF = Average Hourly Bus Flow
GDSF = Average Hourly Goods Vehicle Flow
MGDF = Average Hourly Medium Goods Vehicle Flow
HGDF = Average Hourly Heavy Goods Vehicle Flow
BUS% = Bus Flow as a Percentage of Total Flow
GDS% = Goods Vehicle Flow as a Percentage of Total Flow
LOGF = Logarithm Average Hourly Vehicular Flow
PCON = Average Pavement Flow per Metre Width of Pavement
TCON = Traffic Congestion Measure (Flow/Capacity Ratio)

the series of traffic and pedestrian parameters identified in Sections 3.3 and 3.4. Generally the correlations are poor; the strongest correlations occur for 'overall nuisance', which correlates particularly well with heavy goods vehicle flow, and also with flows of all traffic and all goods vehicles; and 'amount of traffic' which correlates best with the logarithm of traffic flow and also with the total traffic and goods traffic flows and the percentage of buses. Otherwise the only sizeable correlations are between fumes and heavy and total goods vehicle flow. The correlations for noise, safety, parked vehicles, ease of crossing, fear of traffic and 'like to visit' are all extremely weak.

Table 31 presents the results of a stepwise multiple regression for the same factors for all 15 sites and, separately, for the 11 sites which produce the most logical scores in Table 29 (see Section 4.4). In each case tests have been made with the follcwing sets of variables, and the best correlation taken:

i) TOTF, BUSF, GDSF, PCON, TCON
ii) TOTF, BUSF, MGDF, HGDF, PCON, TCON
iii) TOTF, BUS%, GDS%, PCON, TCON
iv) LOGF, BUSF, GDSF, PCON, TCON

The variables are defined in Table 30. An alternative definition of PCON based on pedestrian concentration (percentage of observations > 0.2 peds/m2) was also tested, but found to be an explanatory variable for parked vehicles and total traffic using scores from the 11 sites only. This is shown as PEDC in Table 31.

For all sites, correlations are still poor for noise, parked vehicles, ease of crossing and, in particular, 'like to visit'. Overall nuisance correlates particularly well, with an r value of with total flow, median and heavy goods vehicle flow being the three explanatory variables. It also has the best correlation with one explanatory variable, average heavy goods vehicle flow with an r value of 0.76. Amount of traffic has a correlation of 0.79, logarithm of traffic, bus flow and pavement concentration flow explaining the variance. Crowds has an r value of 0.71, with total flow, goods vehicle flow, and pavement concentration as explanatory variables.

When the four sites with counter-intuitive ratings are excluded, most correlations improve markedly. Overall nuisance has an r value of 0.97, with logarithm of traffic, heavy goods vehicle flow and traffic congestion index as explanatory variables. There is, however, no clear reason why these sites should have performed differently.

Table 32 lists the equations for the three constructs with the highest correlations for all 15 sites. It also lists the equations generated for overall nuisance and total traffic for interpolated medians (see Section 4.3). The interpolated medians in both cases produce identical or lower r values and identical explanatory variables. In the case of overall nuisance two of the three explanatory variables are different, but heavy goods flow still has the dominant effect. It appears from these comparisons that interpolation of medians.

Table 31

Stepwise Multiple Correlation Coefficients for Individual Constructs Against Different Explanatory Variables

	All Sites			11 Sites		
Construct	1st Variable	2nd Variable	3rd Variable	1st Variable	2nd Variable	3rd Variable
Crowds	BUSF (0.23)	HGDF,PCON (0.57)	TOTF,HGDF,PCON (0.71)	TCON (0.29)	PCON,GDSF (0.76)	PCON,BUS%,GDSF (0.91)
Noise	TCON (0.22)	HGDF,TCON (0.29)	HGDF,TCON,PCON (0.34)	TOTF (0.56)	TOTF,PCON (0.79)	TOTF,TCON,PCON (0.90)
Safety when crossing	LOGF (0.23)	LOGF,PCON (0.40)	LOGF,BUSF,PCON (0.42)	LOGF (0.36)	BUSF,PCON (0.65)	BUSF,TCON,LOGF (0.72)
Fumes	GDSF (0.32)	BUSF,GDSF (0.39)	BUSF,GDSF,PCON (0.48)	GDSF (0.77)	GDSF,TCON (0.79)	GDSF,TCON,LOGF (0.83)
Parked Vehicles	BUSF (0.20)	MGDF,PCON (0.36)	HGDF,MGDF,PCON (0.38)	PEDC (0.21)	TCON,BUS% (0.51)	TCON,GDSF,BUS% (0.58)
Ease of Crossing	TCON (0.18)	TCON,PCON (0.24)	LOGF,BUSF,PCON (0.36)	TOTF (0.38)	TCON,LTOFF (0.51)	TCON,PCON,LOGF (0.56)
Fear of Traffic	GDSF (0.20)	GDSF,PCON (0.26)	GDSF,BUSF,PCON (0.48)	GDSF (0.36)	GDSF,TCON (0.43)	GDSF,TCON,TOTF (0.54)
Total Traffic	LOGF (0.69)	LOGF,BUSF (0.75)	LOGF,BUSF,PCON (0.79)	GDSF (0.53)	LOGF,GDS% (0.64)	PEDC,LOGF,GDS% (0.71)
Like to Visit	BUSF (0.14)	BUSF,TCON (0.16)	LOGF,BUSF,PCON (0.25)	BUSF (0.18)	BUSF,LOGF (0.21)	BUSF,TCON,HGDF (0.27)
Overall Nuisance	HGDF (0.69)	HGDF,PCON (0.75)	HGDF,PCON,BUSF (0.81)	HGDF (0.92)	HGDF,LOGF (0.97)	HGDF,LOGF,TCON (0.97)

For variables see Table 30.

Table 32

Best Fit Equations for Overall Nuisance, Total Traffic and Crowds; Fifteen Sites

(a) Overall Nuisance

(i) Integer Medians

$$ON = 5.28 - \underset{(0.0001)}{0.031\ HGDF} - \underset{(0.027)}{0.0017\ PCON} + \underset{(0.09)}{0.007\ BUSF} \qquad [r^2 = 0.81]$$

(ii) Interpolated Medians

$$ONI = 4.87 - \underset{(0.0001)}{0.028\ HGDF} - \underset{(0.02)}{0.0006\ PCON} + \underset{(0.11)}{0.0035\ BUSF} \qquad [r^2 = 0.81]$$

(b) Total Traffic

(i) Integer Medians

$$TT = 6.12 - \underset{(0.0004)}{1.5\ LOGF} + \underset{(0.12)}{0.004\ BUSF} + \underset{(0.15)}{0.0105\ PCON}$$

$$[r^2 = 0.79]$$

(ii) Interpolated Medians

$$TTI = 4.68 - \underset{(0.024)}{1.14\ LOGF} + \underset{(0.115)}{0.006\ BUSF} + \underset{(0.102)}{0.018\ PCON}$$

$$[r^2 = 0.62]$$

(c) Crowds

(Integer Medians)

$$CR = 5.90 - \underset{(0.11)}{0.0007\ TOTF} - \underset{(0.24)}{0.0182\ HGDF} - \underset{(0.001)}{0.0027\ PCON}$$

$$[r^2 = 0.71]$$

Key:

ON = Overall Nuisance Score, Integer Medians
ONI = Overall Nuisance Score, Interpolated Medians
TT = Total Traffic Score, Integer Medians
TTI = Total Traffic Score, Interpolated Medians
CR = Crowds Score, Integer Median

For other variables see Table 30.
Figures in ( ) are F scores; a score of over 0.05 represents an insignificant addition to the equation.

does little to improve the correlations obtained. Since the interpolation facility was not available in the statistical packages used, it was decided not to use interpolation in the remainder of the analysis.

4.6 Relationships Between Ratings and Traffic Parameters for Different Usual Times of Visit

Table 33 indicates for each site the percentage stating each normal time of visit. In most sites, between a sixth and a third of respondents specified 'varies'; the exceptions were Sheffield, where almost half did, and Aberdeen and Bristol, where less than 10% did. In all cases 0930-1130 and 1130-1400 were the most popular times, accounting jointly for between 32% and 60% of the response; periods before 0830 after 1700 and evenings were rarely mentioned, and the periods 0830-0930 and 1530-1700 usually accounted for less than 10% each. These have been excluded from further analysis.

Tables 34-35 present correlation coefficients for ratings for the three most common times of visit correlated against traffic conditions for those periods; Table 36 is the result of correlating ratings for those replying 'varies' against traffic conditions for the day as a whole. Generally the correlations are less strong than those for Table 30, except for overall nuisance, where slightly stronger correlations occur with overall traffic and goods vehicle flows. There is no evidence, therefore, that traffic conditions at the time of most usual visit have a greater effect on attitudes than do general traffic conditions. This is reinforced by Table 37, which indicates that the ratings for individuals usually visiting at different times differ significantly for only a few constructs at a few sites.

4.7 Possible Thresholds for Individual Traffic Parameters

As a final stage in the analysis of attitudes at the 15 streets, some of the relationships in Table 30 were plotted in Figures 14-17 to investigate the existence of possible thresholds above which environmental disturbance was markedly increased. In all cases median scores were plotted against either total flow or goods vehicle flow, which appear to explain the greatest variance in scores.

Figure 14 plots ratings of overall nuisance against total traffic. Scores remain uniform until a flow of 1000 veh/h is reached. Beyond this, sites are more scattered in their scores, with a marked decline at all sites other than Lewisham and Manchester as flow increases. Figure 15 plots amount of traffic against average hourly vehicle flow. Here there appears to be a resonably linear decline as flow increases except for Twickenham (site 11). Figures 16 and 17 present similar plots for average hourly goods vehicle flow. Here only Hazel Grove shows a marked decline in score for overall nuisance, suggesting a threshold of above 150 goods vehicles/hour. Figure 17 again shows a reasonably linear decline in score for amount of traffic as goods vehicle flow increases. Winchester has an atypically low score. Figure 18 shows the plot for overall nuisance against hourly heavy goods vehicle flow. Results are similar to those for Figs. 16, 17 suggesting a threshold of above 50 heavy goods vehicles/hr

Table 33

Usual Time of Visit to Interview Street

(% of All Respondents)

Location	0830	0830–0930	0930–1130	1130–1400	1400–1530	1530–1700	Evening	Varies
01 Chesterfield	2	8	25	18	13	5	1	27
02 Sheffield	2	8	16	16	8	5	1	44
03 Lanark	2	6	22	20	14	2	1	30
04 Hebden Bridge	2	8	24	18	11	4	1	23
05 Kilmarnock	1	7	16	26	10	8	1	32
06 Aberdeen	2	9	27	26	17	8	2	9
07 Lewisham	1	4	30	29	14	3	1	17
08 Epsom	2	9	24	26	12	5	1	20
09 Winchester	2	10	26	27	7	4	2	24
10 Guildford	3	11	30	21	11	2	1	22
11 Twickenham	2	5	20	20	10	5	2	34
12 Bristol	1	12	37	23	15	4	1	8
13 Manchester	1	11	24	24	13	8	1	16
14 Coventry	3	9	24	21	12	4	2	24
15 Hazel Grove	1	5	30	19	12	3	1	31

Table 34

Correlation Coefficients: Median Scores for Usual Time of Visit 0930-1130 by Traffic Conditions for Same Time Period

Construct:	3	5	6	7	8	10	11	12	13
TOTF	0.02	0.14	0.23	0.01	0.09	0.01	0.48	0.01	0.33
BUSF	0.01	0.06	0.16	0.07	0.01	0.02	0.12	0.09	0.23
GDSF	0.06	0.07	0.37	0.01	0.10	0.10	0.41	0.02	0.60
BUS%	0.01	0.29	0.13	0.03	0.01	0.01	0.30	0.01	0.13
GDS%	0.05	0.01	0.32	0.01	0.01	0.05	0.12	0.01	0.40
LOGF	0.01	0.03	0.14	0.01	0.07	0.01	0.48	0.01	0.17

Table 35

Correlation Coefficients: Median Scores for Usual Time of Visit 1130-1400 by Traffic Conditions for Same Time Period

Construct:	3	5	6	7	8	10	11	12	13
TOTF	0.03	0.20	0.20	0.14	0.30	0.22	0.36	0.02	0.54
BUSF	0.04	0.01	0.01	0.09	0.01	0.03	0.15	0.13	0.02
GDSF	0.06	0.02	0.07	0.18	0.05	0.05	0.16	0.01	0.40
BUS%	0.01	0.04	0.02	0.14	0.28	0.03	0.47	0.05	0.17
GDS%	0.05	0.04	0.01	0.10	0.01	0.01	0.10	0.03	0.03
LOGF	0.01	0.13	0.09	0.11	0.43	0.11	0.46	0.05	0.30

Table 36

Correlation Coefficients: Usual Time of Visit Varies

Construct:	3	5	6	7	8	10	11	12	13
TOTF	0.01	0.34	0.17	0.04	0.19	0.12	0.38	0.01	0.33
BUSF	0.02	0.02	0.22	0.15	0.06	0.01	0.10	0.11	0.01
GDSF	0.04	0.36	0.23	0.01	0.23	0.27	0.32	0.01	0.43
BUS%	0.01	0.13	0.05	0.02	0.15	0.04	0.11	0.01	0.04
GDS%	0.01	0.16	0.07	0.01	0.19	0.23	0.16	0.01	0.13
LOGF	0.01	0.29	0.06	0.03	0.25	0.15	0.29	0.01	0.15

Constructs: See Table 30

Variables:

TOTF = Average Hourly Vehicular Flow
BUSF = Average Hourly Bus Flow
GDSF = Average Hourly Goods Vehicle Flow
BUS% = Bus Flow as a Percentage of Total Flow
GDS% = Goods Vehicle Flow as a Percentage of Total Flow
LOGF = Logarithm Average Hourly Vehicular Flow

Table 37

Constructs for which Ratings were Significantly Different for Different Age Groups and Sexes

Location		Age	Sex
01	Chesterfield	none	none
02	Sheffield	none	none
03	Lanark	pavement quality; shops attractiveness; like to visit	pavement quality
04	Hebden Bridge	fumes	pavement quality
05	Kilmarnock	none	none
06	Aberdeen	none; like to visit	none
07	Lewisham	pavement quality; shops attractiveness	pavement quality
08	Epsom	pavement quality	none
09	Winchester	none	none
10	Guildford	like to visit	none
11	Twickenham	pavements	none
12	Bristol	none	ease of crossing
13	Manchester	none	none
14	Coventry	none	none
15	Hazel Grove	none	none

Fig 14: Plot of Median Score for Overall Nuisance Against Average Hourly Vehicular Flow

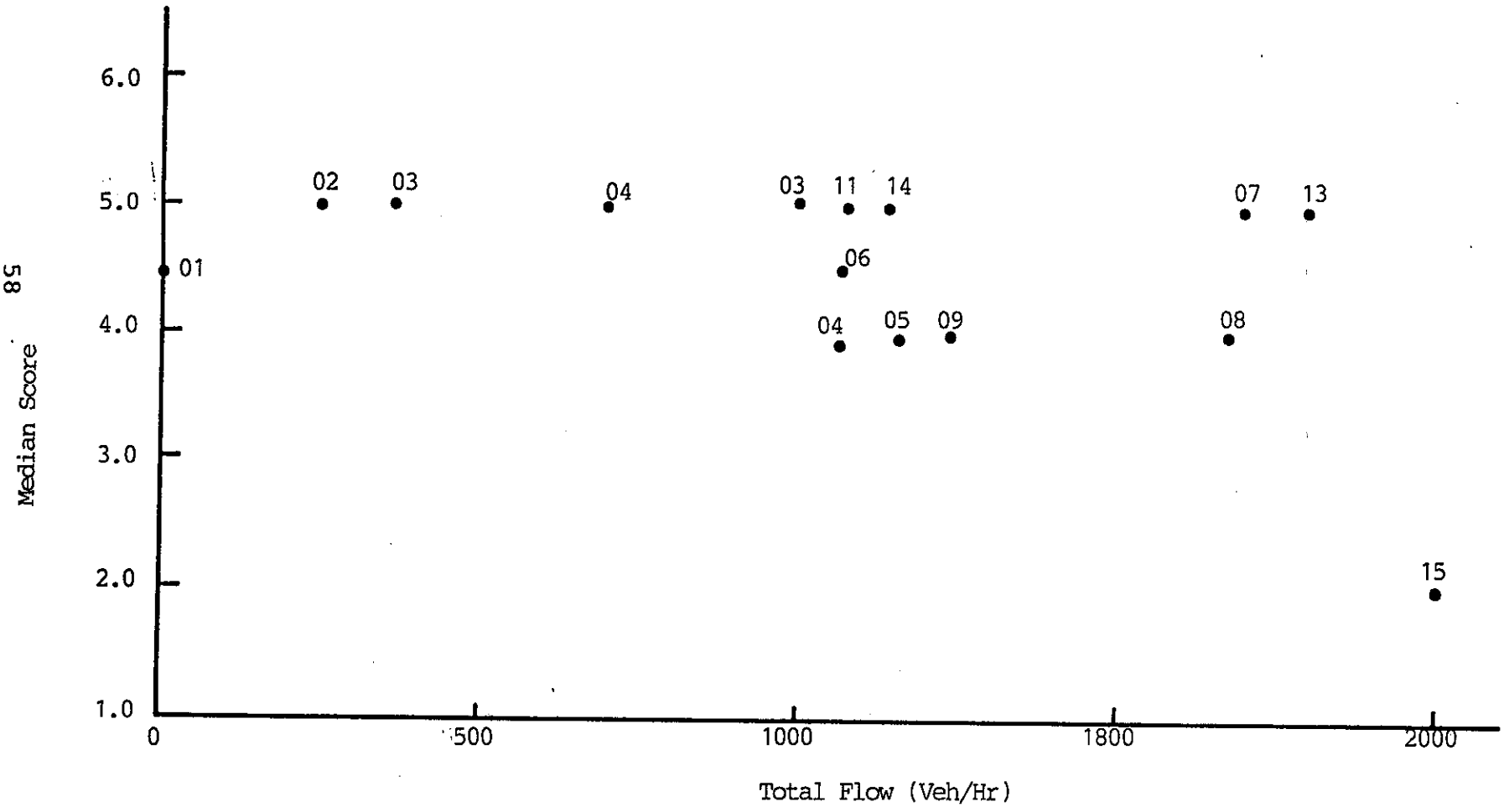


Figure 15: Plot of Median Score for Amount of Traffic Against Average Hourly Vehicle Flow

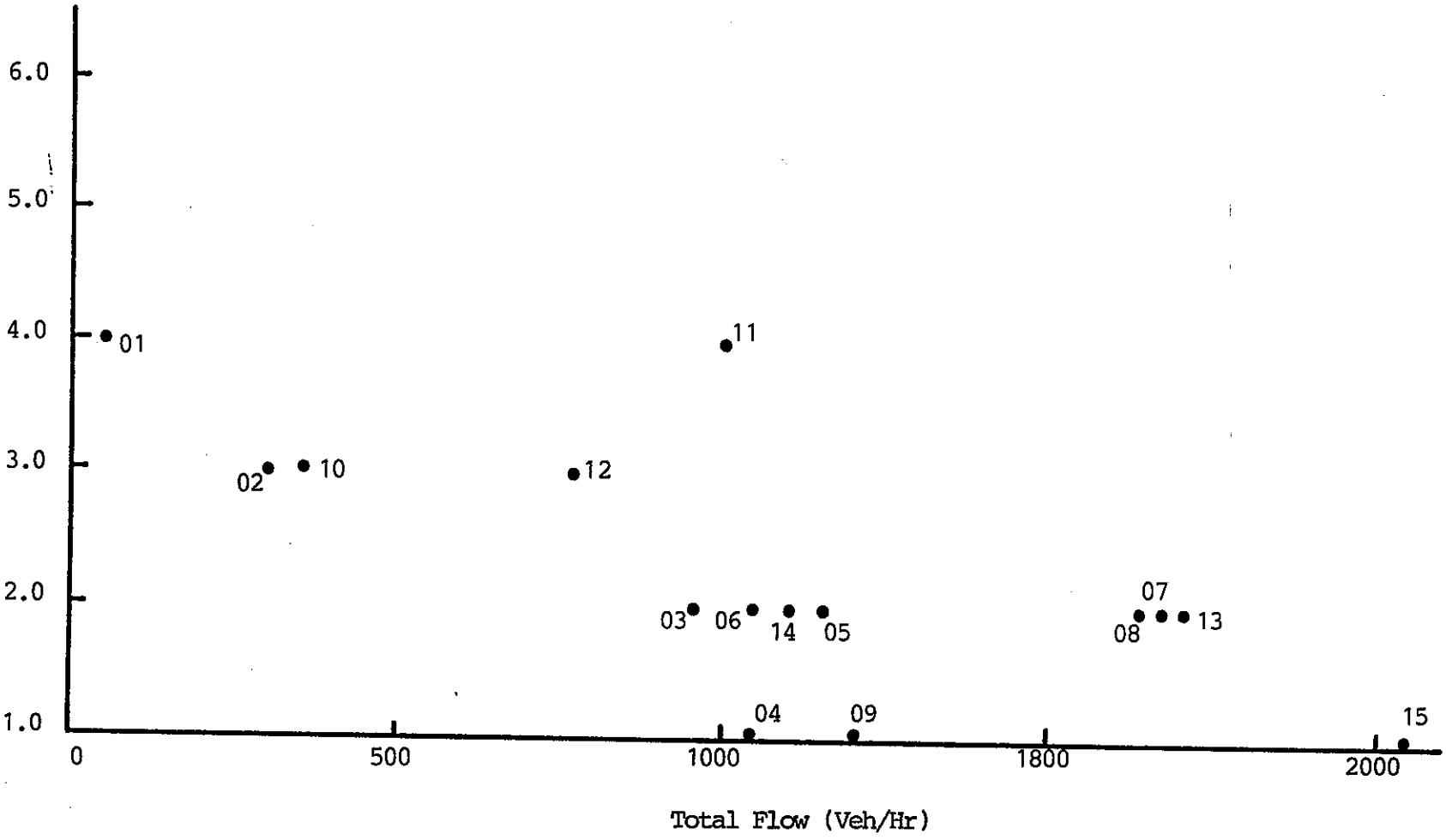


Figure 16: Plot of Median Score for Overall Nuisance Against Hourly Goods Vehicle Flow

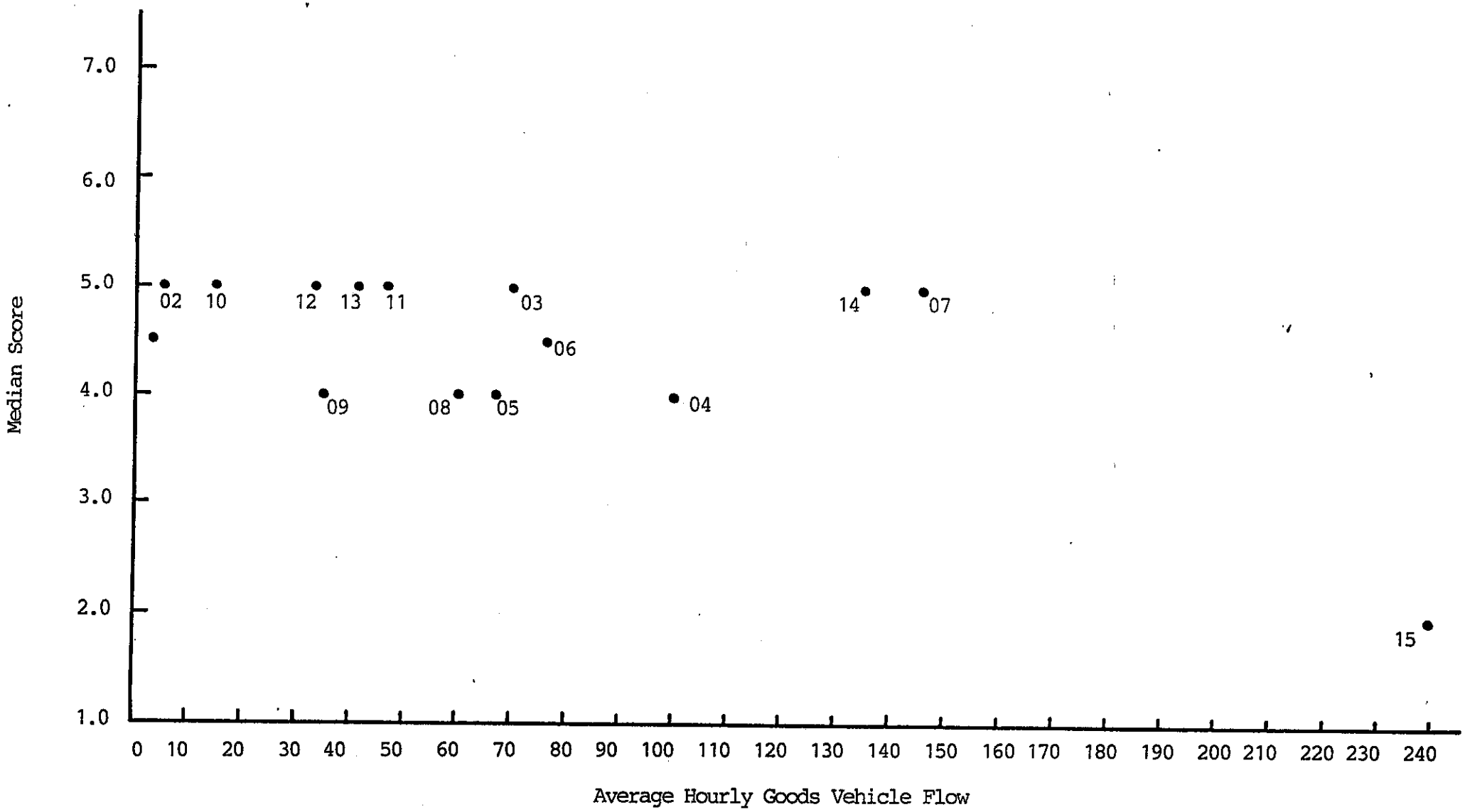


Figure 17: Plot of Median Score for Amount of Traffic Against Average Hourly Goods Flow

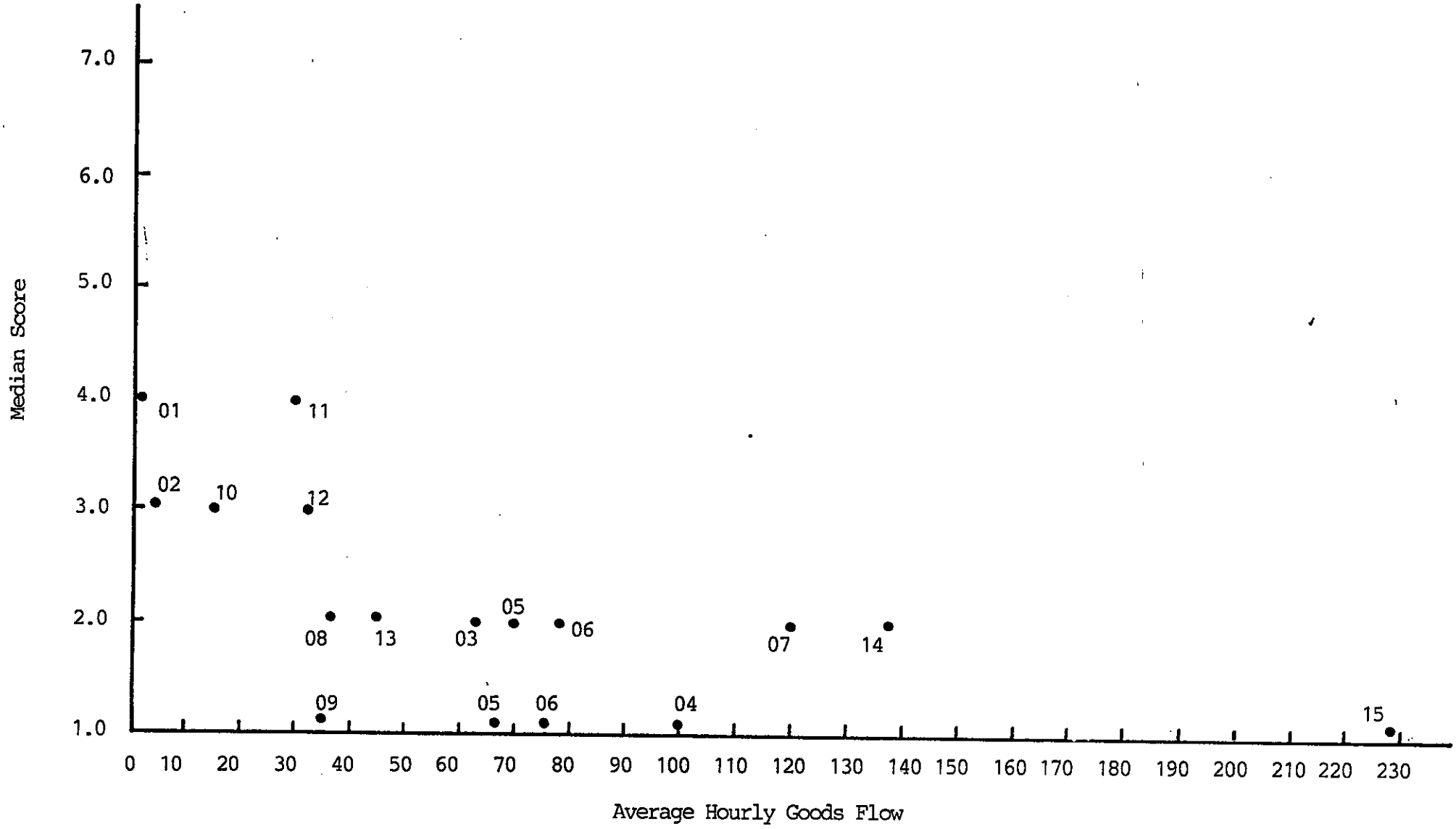
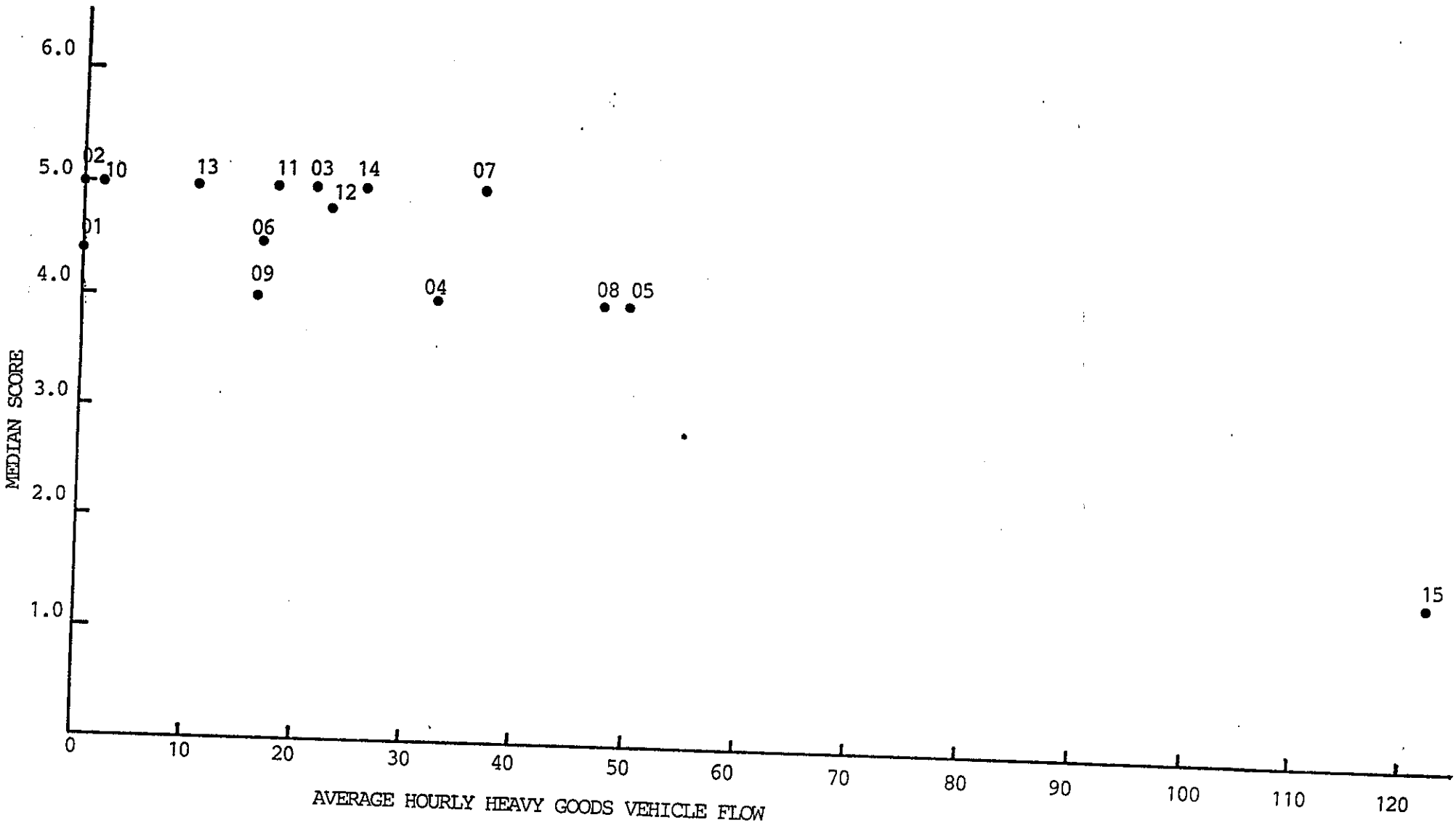


FIGURE 18: Plot of Median Score for Overall Nuisance Against Average Hourly Heavy Goods Vehicle Flow



The relationships for individual environmental factors showed much more scatter, as the results in Table 29 indicated, and no sign of obvious thresholds emerged. Nowhere in the results is there a clear justification for the use of the threshold of doubling of flow suggested in the Manual of Environmental Appraisal.

5. Environmental Perceptions in the Interview and Comparison Streets

5.1 Method of Analysis

The data used in this part of the study involved analysing the ratings obtained for the 43 streets involved in the repertory grid survey. The first stages in the analysis involved comparing ratings for different constructs at each site. Section 5.2 compares median ratings for individual constructs for each street with the overall ranking of the streets at each site. Section 5.3 extends this by assessing the correlation between constructs, and conducting a factor analysis which indicates the relationship between groups of construct.

Section 5.4 then produces an initial comparison within sites of median scores with traffic conditions, and section 5.5 presents relationships for all 43 streets combined, between traffic conditions and median scores for constructs.

5.2 Ranking of Streets

Table 38 indicates the numbers of respondents placing each of the three streets first, second and third. Not all respondents gave 'second and third' rankings. Table 39 indicates the median values for each construct for each site, and the numbers completing the repertory grid. In all cases except Lewisham the number completed exceeded 220. Table 40 demonstrates that Lewisham had by far the highest percentage of respondents not visiting the comparison streets.

Table 41 ranks the median scores and compares them with the summarised rankings from Table 38. Most sites have rankings of medians which are consistent with overall rankings of streets. Those where this is not the case are Sheffield, Hebden Bridge and Epsom. Of all the constructs, 'crowds' (construct 1) has the least satisfactory fit with overall rankings. Conversely, 'like to visit', 'fear of traffic', 'parked vehicles', and attractiveness and interest of shops have the best fit.

In the majority of locations there is a clear preference for one of the three streets in terms of overall conditions for pedestrians (Table 38). In nine locations the preferred street was the interview (street A). In eight of those streets (excluding Twickenham) these streets also have higher traffic flows than streets B or C. This result confirms some of the findings in Chapter 4 that the presence of traffic in a street is only one aspect of individuals' evaluations of a street environment and shows the difficulty of attempting to determine individual assessment of an overall street environment from traffic data alone.

Table 38

Number of People Placing Street A, B, C* in Each Location as 1st, 2nd, or 3rd Best Overall for Pedestrians

		A	B	C
01	1st	103	214	26
	2nd	196	72	63
	3rd	44	43	235
02	1st	296	49	43
	2nd	60	153	172
	3rd	25	185	170
03	1st	217	30	15
	2nd	35	152	65
	3rd	10	57	157
04	1st	204	114	32
	2nd	72	130	115
	3rd	48	91	160
05	1st	201	8	17
	2nd	18	38	166
	3rd	6	168	41
06	1st	221	101	13
	2nd	74	174	79
	3rd	40	52	228
07	1st	277	11	7
	2nd	16	85	73
	3rd	2	45	43
08	1st	174	106	65
	2nd	93	174	62
	3rd	68	52	176
09	1st	9	16	282
	2nd	103	186	17
	3rd	194	95	7
10	1st	200	34	155
	2nd	128	166	94
	3rd	60	185	121
11	1st	49	72	143
	2nd	20	100	36
	3rd	86	84	42
12	1st	210	105	15
	2nd	43	168	68
	3rd	8	53	156
13	1st	90	63	278
	2nd	185	142	69
	3rd	155	125	37
14	1st	50	266	46
	2nd	57	57	150
	3rd	182	29	182

See Table 21 for list of streets; A is the interview street.

Table 39

Median Rating Scores of Constructs by Street*

Location		1	2	3	4	5	6	7	8	9	10	11	12	N
Chesterfield	A	5.0	5.0	4.0	4.0	5.0	4.0	5.0	5.0	5.0	5.0	4.0	5.0	441
	B	6.0	4.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	6.0	6.0	6.0	429
(P)	C	4.0	5.0	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	429
Sheffield	A	4.0	3.0	3.0	4.0	2.0	4.0	5.0	2.0	4.0	2.0	2.0	4.0	470
(P)	B	4.0	3.0	5.0	5.0	5.0	5.0	7.0	5.0	4.0	5.0	5.0	4.0	428
(P)	C	5.0	4.0	5.0	5.0	5.0	5.0	6.0	5.0	5.0	5.0	5.0	6.0	428
Lanark	A	4.0	5.0	5.0	3.0	4.0	5.0	4.0	5.0	4.0	5.0	2.0	5.0	304
	B	3.0	3.0	5.0	3.0	4.0	5.0	3.0	4.0	3.5	3.0	2.0	4.0	243
	C	4.0	4.0	4.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	2.0	4.0	243
Hebden Bridge	A	4.0	4.0	1.0	6.0	3.0	3.0	2.0	3.0	4.0	3.0	1.0	4.0	392
	B	5.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	2.0	4.0	326
	C	5.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0	326
Kilmarnock	A	4.0	5.0	2.0	3.0	3.0	4.0	5.0	3.0	4.0	5.0	2.0	4.0	297
	B	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	2.0	4.0	3.0	3.0	264
(P)	C	6.0	5.0	7.0	6.0	7.0	7.0	7.0	7.0	6.0	7.0	7.0	6.0	264
Aberdeen	A	5.0	2.0	2.0	4.0	3.0	4.0	6.0	4.0	6.0	5.0	2.0	6.0	444
	B	3.0	4.0	3.0	4.0	3.0	4.0	5.0	3.0	2.0	4.0	3.0	2.0	317
	C	3.0	4.0	5.0	5.0	5.0	3.0	5.0	5.0	4.0	6.0	5.0	4.0	317
Lewisham	A	5.0	2.5	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	2.0	5.0	354
	B	3.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	4.0	153
	C	3.0	4.0	4.0	4.0	4.0	3.5	4.0	3.5	2.0	4.0	3.0	4.0	89
Epsom	A	5.0	4.0	3.0	4.0	2.0	4.0	2.0	2.0	6.0	4.0	2.0	5.0	367
	B	4.0	4.0	3.0	4.0	2.0	4.0	2.0	2.0	6.0	4.0	2.0	5.0	305
	C	3.0	4.0	4.0	4.0	4.0	4.0	2.0	3.0	4.0	4.0	5.0	5.0	305
Winchester	A	3.0	5.0	1.0	4.0	3.0	2.0	2.0	4.0	4.0	4.0	3.0	4.0	314
	B	4.0	4.0	2.0	4.0	2.0	3.0	3.0	3.0	3.0	3.0	2.0	4.0	289
(P)	C	6.0	5.0	6.0	5.0	7.0	6.0	7.0	7.0	5.0	7.0	7.0	5.0	289
Guildford	A	4.0	3.0	4.0	4.0	3.0	4.0	3.0	3.0	5.0	4.0	3.0	4.0	441
	B	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	2.0	4.0	429
	C	6.0	5.0	6.0	5.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0	429
Twickenham	A	4.0	4.0	4.0	3.5	4.0	3.0	4.5	4.0	3.0	4.0	2.5	4.0	302
	B	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	247
	C	6.0	4.0	4.0	4.0	6.0	5.0	3.5	4.0	5.0	6.0	5.0	6.0	247
Bristol	A	4.0	4.0	3.0	3.0	2.0	4.0	3.0	3.5	4.0	5.0	3.0	4.0	364
(P)	B	5.0	4.0	7.0	5.0	5.0	7.0	7.0	6.0	4.0	7.0	7.0	5.0	221
	C	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	221
Manchester	A	4.0	3.0	2.0	4.0	3.0	5.0	5.0	3.0	5.0	4.0	2.0	4.0	450
	B	4.0	4.0	5.0	4.0	3.0	4.0	5.0	4.0	5.0	4.0	3.0	4.0	309
(P)	C	5.0	3.0	2.0	5.0	5.0	6.0	7.0	7.0	6.0	7.0	7.0	5.0	309
Coventry	A	4.0	5.0	2.0	4.0	3.0	3.0	5.0	3.0	3.0	4.0	2.0	4.0	408
	B	4.0	5.0	7.0	5.0	7.0	7.0	7.0	7.0	4.0	7.0	7.0	5.0	364
(P)	C	4.0	3.0	4.0	4.0	4.0	4.0	4.5	4.0	4.0	4.0	3.0	4.0	364
Hazel Grove	A	4.0	2.0	1.0	2.0	2.0	1.0	4.0	3.0	4.0	2.0	1.0	4.0	452

* See Table 21 for list of streets; A is the interview street (P) = Pedestrianised
See Table 23 for list of constructs

Table 40

Respondents' Familiarity with Comparison Streets* by Location: (%)

Location		Time of Last Visit to Street				
		Last Week	Last Month	Last Year	Ever	Never
01	B	74	13	2	1	10
Chesterfield	C	40	19	7	2	32
02	B	76	15	3	1	5
Sheffield	C	70	17	4	1	8
03	B	62	16	3	6	8
Lanark	C	65	12	3	5	10
04	B	68	13	4	1	12
Hebden Bridge	C	73	9	2	1	12
05	B	68	18	5	4	5
Kilmarnock	C	89	7	1	1	2
06	B	37	24	11	6	22
Aberdeen	C	55	22	10	3	10
07	B	20	14	10	10	39
Lewisham	C	9	4	6	11	62
08	B	80	10	3	1	7
Epsom	C	52	23	9	5	12
09	B	81	11	4	2	2
Winchester	C	97	2	<1	<1	<1
10	B	66	17	8	3	5
Guildford	C	80	14	3	2	2
11	B	69	14	4	2	11
Twickenham	C	60	16	9	4	11
12	B	60	9	9	<1	22
Bristol	C	50	10	9	2	29
13	B	39	22	8	5	26
Manchester	C	69	16	6	2	8
14	B	69	18	4	1	8
Coventry	C	62	19	5	<1	13

* See Table 21 for list of streets.

Table 41

Ranking Order of Streets* within a Location Based on Median Scores

Location		Constructs 1	2	3	4	5	6	7	8	9	10	11	12	Direct Ranking
01	A	2	1	2	1	1	2	1	1	1	2	2	2	2
Chesterfield	B	1	2	1	1	1	1	3	1	1	1	1	1	1
	C	3	1	2	1	2	2	1	2	2	1	2	3	3
02	A	2	2	2	2	2	2	3	2	2	2	2	2	1
Sheffield	B	2	2	1	1	1	1	1	1	2	1	1	2	3
	C	1	1	1	1	1	1	2	1	1	1	1	1	2
03	A	1	1	1	2	1	1	1	1	1	1	1	1	1
Lanark	B	2	3	1	2	1	1	2	2	3	3	1	2	2
	C	1	2	2	1	1	1	1	2	2	2	1	2	3
04	A	2	1	3	1	3	2	3	2	2	3	3	2	1
Hebden Bridge	B	1	1	2	2	2	1	2	1	2	2	2	2	2
	C	1	1	1	2	1	1	1	1	1	1	1	1	3
05	A	2	3	2	2	3	2	2	3	3	2	3	2	1
Kilmarnock	B	3	2	1	2	2	2	3	2	2	3	2	3	3
	C	1	1	3	1	1	1	1	1	1	1	1	1	2
06	A	1	2	3	1	2	1	1	2	1	2	3	1	1
Aberdeen	B	2	1	2	1	2	1	2	3	3	3	2	3	2
	C	2	1	1	2	1	2	2	1	2	1	1	2	3
07	A	1	2	1	1	1	1	1	1	1	1	2	1	1
Lewisham	B	2	1	1	1	2	3	1	3	2	2	2	2	2
	C	2	1	1	1	1	2	1	2	3	2	1	2	3
08	A	1	1	2	1	2	1	1	2	1	1	1	1	1
Epsom	B	2	1	2	1	2	1	1	2	1	1	1	1	1
	C	3	1	1	1	1	1	1	1	2	1	1	1	3
09	A	3	1	3	2	2	3	3	2	2	2	2	2	3
Winchester	B	2	2	2	2	3	2	2	3	3	3	3	2	2
	C	1	1	1	1	1	1	1	1	1	1	1	1	1
10	A	2	2	2	2	2	2	3	2	2	2	2	2	1
Guildford	B	2	2	2	2	2	2	2	2	3	2	3	2	3
	C	1	1	1	1	1	1	1	1	1	1	1	1	2
11	A	2	1	1	2	2	3	1	1	2	2	3	2	3
Twickenham	B	2	1	1	1	2	2	3	1	2	2	2	2	2
	C	1	1	1	1	1	1	2	1	1	1	1	1	1
12	A	2	1	2	3	3	2	3	3	1	2	3	2	1
Bristol	B	1	1	1	1	1	1	1	1	1	1	1	1	2
	C	2	1	2	2	2	2	2	2	1	3	2	2	3
13	A	2	2	2	2	2	3	2	3	2	2	3	2	3
Manchester	B	2	1	1	2	2	2	2	2	2	2	2	2	2
	C	1	2	2	1	1	1	1	1	1	1	1	1	1
14	A	1	1	3	2	3	3	2	2	1	2	3	2	3
Coventry	B	1	1	1	1	1	1	1	1	2	1	1	1	1
	C	1	2	2	2	2	2	3	3	2	2	2	2	2

* See Table 21 for list of streets; A is the interview street.

Constructs: See Table 23.

5.3 Correlation Between Constructs

Appendix 4 presents for each site the correlations between the ratings given for each pair of constructs to all three streets. The comparisons are based on the Spearman rank test, for which, given the sample sizes available, any value of 0.10 or more is significant at the 5% level. Table 42 indicates the number of sites for which each pair of constructs are significantly related.

The way in which these were computed is as follows. For each site each person's response scores, for each construct for the three streets were compared on a pairwise basis. As an example the scores on the construct noise - not noisy and too much traffic - right amount of traffic for the three streets might have been (7,3,2) and (7,3,2) respectively. These scores are perfectly correlated (i.e. + 1) meaning that a high score on the first construct implies a high score on the second construct and so on. A matrix of correlation scores for every individual is computed and these are then aggregated to produce a correlation score for the sample of interest, in this case the total population sampled. From these scores it is then possible to identify the extent to which groups of constructs share similar meanings or implications.

Table 42 summarises the results, indicating the number of sites for which each pair of constructs are significantly correlated. Six pairs of constructs: safety - ease of crossing; safety - fear of traffic; ease of crossing - fear of traffic; ease of crossing - amount of traffic; shops interesting - like to visit; and fear of traffic - amount of traffic are significantly correlated at all sites. Two groups of association emerge. The first is between attractiveness of shops, interest of shops and desire to visit. The second is between ease of crossing, fumes, fear, parked vehicles, safety and amount of traffic, which in turn are linked, less strongly, to fumes, parked vehicles, and desire to visit. Crowds and pavement condition have fewer significant correlations.

The correlation matrix from this stage of the analysis was then analysed using factor analysis. This identifies the extent to which groups of constructs can be described by one or several hypothetical factors. A useful analogy in thinking about a factor is the handle of an umbrella with the spokes of the frame representing the items which are arranged around this central structure. The object of the analysis is to identify the nature of the arrangement.

Where a factor contains two or more significantly related items (constructs) it is referred to as common factor and the variance of the tests in that factor is known as common variance. The aim of factor analysis is the discovery of these common factors. The techniques for extracting the factors attempt to take out as much common variance as possible in the first factor. The sum of all the common variance of a test is known as the communality (h^2). Table 43 indicates the values for the communality for the first factor extracted by orthogonal rotation and the four constructs with the highest association on this factor.

Table 42

Number of Sites with Significant Correlation Coefficients for Each Pair of Constructs

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	9	11	9	10	9	6	11	13	12	11	13
Crowds		8	9	6	7	6	7	6	6	7	7
Noise			7	9	11	7	9	9	9	10	9
Pavements				6	8	7	6	5	8	8	7
Safety when crossing					11	11	14	11	14	13	11
Fumes						10	12	9	11	12	9
Parked Vehicles							13	5	13	12	9
Ease of Crossing								12	14	14	11
Shops Interesting									12	11	14
Fear										14	13
Amount of Traffic											11

Table 43

Communalities and Most Closely Associated Constructs for the First Factor at Each Site

Site	Communality h	Constructs and Factor Loadings
01 Chesterfield	6.33	Total traffic (0.87), fear traffic (0.87), ease of crossing (0.84), like to visit (0.84)
02 Sheffield	6.76	Total traffic (0.94), fear traffic (0.93), ease of crossing (0.93), general safety (0.89)
03 Lanark	3.2	Crowds (0.72), fear traffic (0.66), pavement quality (0.70), shops/ buildings (0.66)
04 Hebden Bridge	6.82	Total traffic (0.92), noise (0.94), fear traffic (0.88), ease of crossing (0.86)
05 Kilmarnock	10.35	Total traffic (0.98), ease of crossing (0.97), pavement quality (0.97), fear traffic (0.96)
06 Aberdeen	5.31	Total traffic (0.92), crowding (0.82), noise (0.83), ease of crossing (0.77)
07 Lewisham	3.86	Ease of crossing road (0.81), fear of traffic (0.76), general safety (0.72)
08 Epsom	4.48	Ease of crossing (0.75), safety (0.75), pavements crowded (0.71), total traffic (0.69)
09 Winchester	10.25	Total traffic (0.98), noise (0.97), like to visit (0.96), ease of crossing (0.96)
10 Guildford	9.98	Total traffic (0.98), ease of crossing (0.97), safety (0.96), fear of traffic (0.96)
11 Twickenham	6.93	Shops/buildings (0.92), like to visit (0.92), shops/interest (0.88), ease of crossing (0.87)
12 Bristol	6.05	Ease of crossing (0.91), parked vehicles (0.91), fear (0.91), general safety (0.88)
13 Manchester	7.52	Total traffic (0.95), ease of crossing (0.93), fear (0.92), noise (0.88)
14 Coventry	8.59	Ease of crossing (0.96), total traffic (0.96), fear (0.94), safety (0.92)

Key Constructs

Total traffic; ease of crossing; noise; fear of traffic

Kilmarnock, Winchester and Guildford all have high communality values, implying strong relationships between a high proportion of the constructs. Significantly each of these sites is characterised by having a dominant pedestrianised street as the major shopping street. Lanark, Epsom and Lewisham all have low communalities indicating few strong relationships between constructs.

The list of most closely associated constructs differs substantially between sites, indicating that the factor with which they are associated itself differs between sites. It appears unwise therefore to attempt to use any limited set of constructs as proxies for the overall assessment of sites.

5.4 Comparison of Median Scores and Traffic Congestion

It is interesting to compare median scores for the lowest flow streets, and separately for the highest flow streets, using the detailed results in Table 39.

Those streets which are pedestrianised do not always have higher median scores. While the majority have median scores of 6.0 or 7.0, for many constructs the scores range from 3.0 to 5.0. Pedestrian streets in Chesterfield and Sheffield perform particularly badly.

Conversely streets with traffic flows in excess of 1000 veh/h usually have median scores of 4.0 or less. The only constructs for which this is not the case are 'parked vehicles' (street B in Aberdeen and Manchester) and 'interest of shops' (street B in Epsom and Manchester). Neither is related to traffic flow.

It is also possible from Table 39 to compare the differences in median scores for locations with differing degrees of contrast between streets. For this purpose, four groups of location can be identified:

(1) all low flow (Chesterfield, Sheffield, Guildford)

(2) one low flow, one or more medium flow (Lanark, Hebden Bridge, Kilmarnock, Winchester, Bristol, Coventry)

(3) one low flow, or one high flow (Aberdeen, Twickenham, Manchester)

(4) all high or medium flow (Lewisham, Epsom)

In group (1) differences of as much as four scale points were found across constructs; in Guildford in particular differences were substantial for the constructs safety, ease of crossing, fear of and amount of traffic. In group (3) the high flow street is usually given the lowest score, although the differences are not marked. In group (4) differences of two scale points are obtained, but usually only in assessing shops themselves.

It appears from this analysis that within locations, respondents are able to identify differences between environmental conditions when traffic is present, but that other factors influence their assessment of pedestrianised streets, and that as a result not all pedestrianised streets will be considered superior to those with traffic.

5.5 Correlations Between Constructs and Traffic Variables

Table 44 presents the results of simple linear regressions between nine constructs and the four traffic variables for which data was available. All 43 streets have been included, except where data on an individual variable is not available. Correlations are generally stronger than those for the 15 sites, but none is particularly strong. Interestingly goods vehicle flow has poorer correlations; the best are obtained with the logarithm of traffic flow.

Table 45 presents the results of a stepwise multiple regression for the same factors for the 43 streets. Amount of traffic produces the highest correlation (0.71) with the logarithm of hourly traffic flow, hourly goods vehicle flow and pavement flow as the explanatory variables. Logarithm of hourly vehicle flow is a better explanatory variable for each construct than hourly traffic flow alone. The results for the 43 streets for the constructs noise, safety, parked vehicles and ease of crossing are better than for the 15 sites. For the remaining constructs the relationships are not as high, that for crowds being very much lower. In comparing results however it needs to be borne in mind that the data on which the 43 sites analysis is based is not as detailed.

Table 44

Correlation Coefficients for All Streets (N = 43)

Parameters	Constructs 2	3	5	6	7	8	10	11	12
TOTF	0.13	0.17	0.29	0.28	0.18	0.30	0.19	0.31	0.09
LOGF	0.27	0.24	0.39	0.38	0.41	0.45	0.29	0.49	0.10
GDSF	0.13	0.21	0.22	0.23	0.08	0.12	0.11	0.30	0.07
BUSF	0.12	0.08	0.24	0.09	0.07	0.11	0.11	0.18	0.07

Constructs

2 = Crowds
3 = Noise
5 = Safety
6 = Fumes
7 = Parked Vehicles
8 = Ease of Crossing
10 = Fear of Traffic
11 = Total amount of Traffic
12 = Like to Visit

TOTF = Average Hourly Vehicular Flow
LOGF = Logarithm of Average Hourly Vehicular Flow
GDSF = Average Hourly Goods Vehicular Flow
BUSF = Average Hourly Bus Flow

Table 45

Stepwise Multiple Correlatin Coefficients for Individual Constructs Against Different Explanatory Variables

Construct	1 Variable	2 Variable	3 Variable
Noise	LOGF (0.31)	LOGF , GDSF (0.35)	LOGF, GDSF, PCON (0.37)
Crowds	LOGF (0.31)	LOGF , BUSF (0.33)	LOGF, GDSF, BUSF (0.34)
Safety when crossing	LOGF (0.52)	LOGF , PCON (0.56)	LOGF, BUSF, PCON (0.57)
Fumes	LOGF (0.43)	LOGF , GDSF (0.48)	LOGF, GDSF, PCON (0.48)
Parked Vehicles	LOGF (0.48)	LOGF , BUSF (0.57)	LOGF, GDSF, BUSF (0.58)
Ease of Crossing	LOGF (0.55)	LOGF , PAV (0.56)	LOGF, GDSF, PAV (0.56)
Fear of Traffic	LOGF (0.36)	LOGF , PCON (0.41)	LOGF, BUSF, PCON (0.41)
Amount of Traffic	LOGF (0.66)	LOGF , GDSF (0.70)	LOGF, GDSF, PCON (0.71)
Like to Visit	LOGF (0.13)	LOGF , GDSF (0.15)	LOGF, GDSF, BUSF (0.16)

TOTF = Average Hourly Vehicular Flow
GDSF = Average Hourly Goods Vehicle Flow
BUSF = Average Hourly Bus Flow
LOGF = Logarithm of Hourly Vehicular Flow
PCON = Average Pavement Flow

6. Conclusions

6.1 Pedestrian Characteristics

6.1.1 Typically, 60% or more of pedestrians interviewed were on shopping trips; other significant purposes were work and personal business and, in two cases, leisure.

6.1.2 Car, bus and walking were the most common modes of access to the centre, with bus the most common in the largest centres, and walking most common in the smaller ones.

6.1.3 On average, interviewees stated that they were spending just under two hours walking in the centre; at only three centres was the average under an hour. This implies that pedestrians are exposed to environmental conditions for very considerable periods of time.

6.1.4 Interviewees were typically frequent and long standing visitors to all interview streets. 20% or more visited every day at seven sites, and at a different set of seven sites respondents had been visiting the centre, on average, for 20 years or more.

6.1.5 90% or more of respondents had no noticeable or stated walking problem. At most sites 75% to 85% of respondents were unencumbered, though this fell to around 50% at four centres. The main forms of encumbrance were carrying shopping and accompanying children.

6.2 Environmental Perceptions in the Interview Streets

6.2.1 Respondents were asked to assess the street they were interviewed in against 13 constructs, of which eight were traffic-related, and two were general in nature. Most of the traffic-related constructs had ratings which were not normally distributed. The rating for amount of traffic was usually skewed to the 'bad' pole.

6.2.2 In most cases the sites with the worst median ratings were those with the worst traffic conditions, and vice-versa. Four sites however, exhibited ratings which did not accord with the traffic conditions experienced.

6.2.3 Simple linear regressions with traffic variables were generally poor. However 'overall nuisance' correlated particularly well with heavy goods vehicle flow, and also with flows of all traffic and all goods vehicles. Amount of traffic correlated best with the logarithm of traffic flow, but also with flows of all traffic and all goods vehicles, and with the percentage of buses.

6.2.4 Stepwise multiple regression showed particularly good correlations for overall nuisance, crowds and amount of traffic. Overall nuisance was best explained by bus flow, goods vehicle flow and pavement flow. Crowds was best explained by total flow, heavy goods vehicle flow and pavement flow. Amount of traffic was best explained by the logarithm of traffic flow, bus flow and total goods vehicle flow.

6.2.5 Removal of the four sites which gave counter-intuitive results greatly improved the correlation, but there is no clear reason why these sites should have performed differently.

6.2.6 Disaggregation by usual time of visit and traffic conditions at that time did nothing to improve the correlation with individual traffic variables.

6.2.7 Investigation of the relationships between overall nuisance and total flow and goods vehicle flow showed tentative thresholds at 1000 veh/h and 150 goods vehicles/h. Relationships with amount of traffic were reasonably linear, suggesting no clear threshold. Relationships for individual environmental factors across sites showed too much scatter to enable thresholds to be identified.

6.2.8 There was no evidence to support the use of doubling of traffic flow as a threshold as recommended by the Manual of Environmental Appraisal. Tentatively, it appears that environmental effects of traffic on pedestrians should be assessed once total flow exceeds 1000 veh/h or goods vehicle flow exceeds 150/h.

6.3 Environmental Perceptions in Comparison Streets

6.3.1 Individuals' direct rankings of streets within a location show in general a clear preference for one of the three streets - most often the interview street. The preferred street is not necessarily that with the lowest traffic flow indicating that other factors such as shopping facilities, crowds and pavements are important in terms of overall preference for a street.

6.3.2 The median rating scores of constructs show that where the street is pedestrianised the majority of constructs are rated as 5.0 or above. However, the pedestrianised streets in Chesterfield and Sheffield are evaluated less favourably than those in other locations, suggesting that other factors influence assessments. Where traffic flows are greater than 1000 vph the majority of constructs are rated at 4.0 or below.

6.3.3 The greatest range of median scores within a location occurs where one or more of the comparison streets has a medium to high flow and one of the streets is a low flow. There are less marked differences, as would be expected, between the assessment of streets where each of the streets has a high traffic flow. However, where all streets have low flows, substantial differences occur across all constructs, again suggesting that other factors than traffic flow influence assessments at low flow.

6.3.4 Generally the discrimination between sites at a location was better than that between locations, although even so the assessment of the interview street was often higher than would be expected. It appears that there may be an underlying process whereby respondents normalise their assessments in terms of local conditions. If this is the case then cross-sectional comparisons across sites in different parts of the country may be a less useful source of assessment of pedestrian amenity than more detailed comparison of a range of sites in one location.

6.3.5 The constructs 'like to visit', 'amount of traffic', 'parked vehicles', 'shops attractive' and 'shops of interest' show the most consistent ranking of streets compared with the direct ranking order. The assessment of 'crowding' shows the least satisfactory comparison.

6.3.6 Six pairs of constructs are significantly related across the three streets at every site. These are safety - ease of crossing; safety - fear of traffic; ease of crossing - fear of traffic; ease of crossing - amount of traffic; shops ofinterest - like to visit; and fear of traffic - amount of traffic. Two broad groups of paired relationships relating to 'shops' and 'traffic' emerge. Crowds, noise and parked vehicles are found to be less frequently related to the other constructs.

6.3.7 However, within site comparisons using factor analysis show considerable differences in the grouping of constructs. No common grouping of constructs on the first factor using extracted by principal components was found across locations, and it would be unwise to use selected constructs as proxies for the others.

6.3.8 For the 43 streets, logarithm of hourly traffic flow was the single best explanatory variable for all constructs. The only good multiple correlation was for amount of traffic, with logarithm of hourly traffic flow, hourly goods vehicle flow, and pavement flow. Correlation for 'like to visit' was particularly poor.

6.3.9 Generally it appears that factors other than traffic are major determinants of perceived amenity, and that comparison of a range of sites at one location is likely to be the best way of improving our understanding of the role of traffic in determining amenity.

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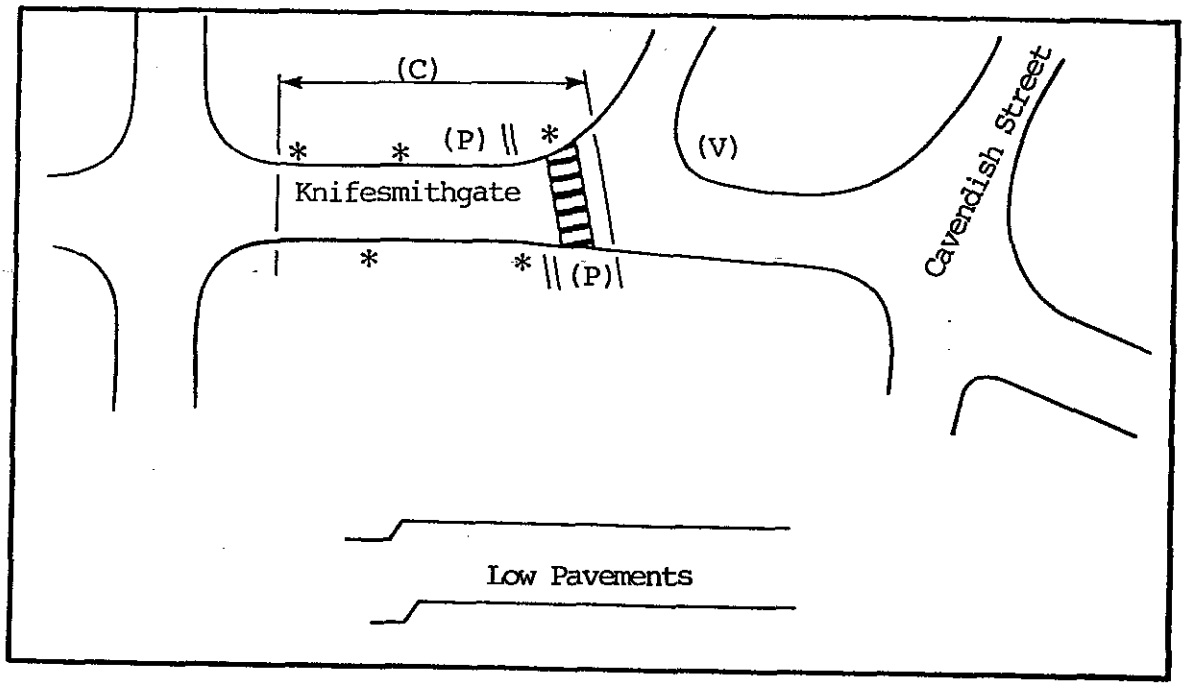
APPENDIX 1: SITE PLANS AND DESCRIPTIONS

01 Knifesmithgate - Chesterfield



(V) Video Location
* Interview Staff

Pavement Counts | |(P)
Crossing Counts | |(C)

Road Width 7m
Pavement Width 3m

Analysis Pavement B

Traffic Conditions: Bus Priority
Access Only for Other Traffic

Shopping Facilities: 3 Department Stores
Various Small Shops

Crossing Facilities: Pedestrian Crossing

Comparison Streets: (1) Low Pavements (Pedestrianised)
(2) Cavendish Street

Surveys:			
	Video	✓	)
	On Street Interviews	✓ 21/10/86	) 19, 20/10/86
	Manual Classified Counts	✓ 21/10/86	)
	CO, Noise	x	
	Household Interviews	x	

Comment: 'Small Urban Other'

Table A2

DESIGN SATURATION FLOWS (URBAN ROADS)

ROAD TYPE:

All Purpose Road Frontage development, side roads, pedestrian crossings, bus stops, waiting restrictions throughout day, loading restrictions at peak hours.

(a) 2 Lane Carriageway

Width	6.1 m	6.75 m	7.3 m	9 m	10 m	
Peak Hourly Flow (Vehicles/Hr)	1100	1400	1700	2200	2500	(Both directions of flow)

(b) Undivided Carriageway

Width	12.3 m (4 lane)	13.5 m (4 lane)	14.6 m (4 lane)	18 m (6 lane)	
Peak Hourly Flow (Vehicles/Hr)	1700	1900 *(2950)	2100 *(3200)	2700	(One direction of flow)

(c) One Way Street

Width	6.1m	6.75m	7.3m	9m	10m	11m	
Peak Hourly Flow (Vehicles/Hr)	1800	2000	2200	2850	3250	3550	(One direction of flow)

(d) Corrections for HGV's (15%)

HGV Content	Total Reduction in Flow Level (Vehicles/Hr) 10m wide and above single carriageway road (per carriageway)	10m wide and below single carriageway road (per carriageway)
15-20%	150	100
20-25%	225	150

NB: * Figures in brackets denote dual carriageway flow

Source: DoE Technical Memo H9/76

Appendix 4

Correlations between ratings given for each pair of constructs to all three streets in each of the 14 sites. The values given are Spearman rank correlation coefficients and the critical levels for significance at the 5% level are given, together with the sample size, at the foot of each table.

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.03	0.24	0.00	0.14	0.17	0.00	0.20	0.34	0.28	0.22	0.40
Crowds		0.02	0.19	0.07	0.04	0.06	0.05	0.02	0.05	0.05	0.06
Noise			-0.03	0.17	0.85	0.03	0.20	0.21	0.22	0.27	0.28
Pavements				-0.03	0.08	0.12	0.04	0.00	0.04	0.04	0.00
Safety					0.13	0.13	0.31	0.20	0.32	0.28	0.22
Fumes						0.11	0.24	0.12	0.22	0.26	0.18
Parked Vehicles							0.23	0.01	0.17	0.26	0.06
Ease of Crossing								0.23	0.38	0.35	0.30
Shops Interesting									0.25	0.22	0.41
Fear										0.51	0.31
Amount of Traffic											0.31

CHESTERFIELD

Sample Size = 429

Threshold for Significance = 0.09 (5%)
0.12 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.11	0.25	0.09	0.11	0.10	-0.02	0.19	0.34	0.13	0.16	0.40
Crowds		0.22	0.06	0.15	0.13	0.09	0.18	0.13	0.20	0.19	0.08
Noise			0.12	0.37	0.26	0.18	0.36	0.19	0.36	0.40	0.23
Pavements				0.07	0.11	0.06	0.13	0.06	0.12	0.13	0.07
Safety					0.20	0.24	0.44	0.14	0.46	0.50	0.13
Fumes						0.14	0.27	0.09	0.24	0.26	0.11
Parked Vehicles							0.29	0.01	0.26	0.28	0.03
Ease of Crossing								0.18	0.53	0.56	0.20
Shops Interesting									0.16	0.17	0.34
Fear										0.60	0.25
Amount of Traffic											0.24

SHEFFIELD

Sample Size = 428

Threshold for Significance = 0.09 (5%)
0.12 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.19	0.05	0.21	0.01	0.02	0.04	0.02	0.12	0.12	0.04	0.14
Crowds		0.08	0.19	0.08	0.05	0.10	0.10	0.10	0.20	0.07	0.11
Noise			0.03	0.01	0.00	0.05	0.05	0.04	0.00	0.10	0.02
Pavements				0.05	0.05	0.07	0.10	0.06	0.13	0.07	0.13
Safety					0.05	0.12	0.27	0.03	0.12	0.09	0.11
Fumes						0.05	0.08	0.04	0.10	0.08	0.03
Parked Vehicles							0.17	0.03	0.13	0.15	0.06
Ease of Crossing								0.02	0.20	0.17	0.17
Shops Interesting									0.08	0.06	0.15
Fear										0.18	0.16
Amount of Traffic											0.10

LANARK

Sample Size = 243

Threshold for Significance = 0.11 (5%)
0.14 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.02	0.30	0.03	0.24	0.18	0.04	0.26	0.26	0.26	0.30	0.37
Crowds		-0.01	0.10	0.06	0.04	0.09	0.01	0.02	0.01	0.02	0.08
Noise			-0.17	0.36	0.34	0.19	0.34	0.24	0.39	0.49	0.36
Pavements				-0.06	0.13	0.10	0.03	0.00	0.07	0.10	0.03
Safety					-0.22	0.15	0.42	0.21	0.36	0.36	0.26
Fumes						0.12	0.20	0.12	0.23	0.32	0.22
Parked Vehicles							0.19	-0.06	0.18	0.23	0.11
Ease of Crossing								0.20	0.39	0.40	0.28
Shops Interesting									0.22	0.28	0.32
Fear										0.42	0.31
Amount of Traffic											0.37

HEBDEN BRIDGE

Sample Size = 326

Threshold for Signifcance = 0.10 (5%)
0.11 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.07	-0.34	0.49	0.44	0.27	0.42	0.46	0.53	0.42	0.45	0.54
Crowds		-0.22	0.15	0.19	0.17	0.04	0.20	0.05	0.15	0.24	0.17
Noise			-0.46	-0.53	-0.37	-0.34	-0.54	-0.35	-0.46	-0.63	-0.46
Pavements				0.54	0.39	0.48	0.57	0.48	0.54	0.60	0.56
Safety					0.39	0.45	0.68	0.45	0.61	0.67	0.59
Fumes						0.33	0.41	0.34	0.36	0.45	0.35
Parked Vehicles							0.47	0.44	0.47	0.48	0.42
Ease of Crossing								0.49	0.60	0.70	0.57
Shops Interesting									0.51	0.48	0.60
Fear										0.65	0.57
Amount of Traffic											0.62

KILMARNOC

Sample Size = 264

Threshold for Significance = 0.11 (5%)
0.14 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.39	0.24	0.05	0.08	0.07	0.08	0.07	0.53	0.01	0.30	0.54
Crowds		0.28	0.10	0.05	0.13	0.02	0.12	0.37	0.04	0.26	0.31
Noise			0.06	0.20	0.18	0.01	0.26	0.12	0.15	0.37	0.11
Pavements				0.12	0.07	0.03	0.07	0.02	0.02	0.06	0.01
Safety					0.15	0.07	0.44	0.07	0.32	0.35	0.08
Fumes						0.05	0.19	0.04	0.17	0.27	0.07
Parked Vehicles							0.10	0.08	0.10	0.04	0.10
Ease of Crossing								0.63	0.36	0.45	0.08
Shops Interesting									0.11	0.11	0.50
Fear										0.32	0.10
Amount of Traffic											0.09

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.09	0.02	0.01	0.10	0.02	0.08	0.15	0.44	0.19	0.06	0.42
Crowds		0.01	0.13	0.08	0.04	0.06	0.02	0.19	0.01	0.12	0.14
Noise			0.03	0.02	0.09	0.03	0.01	0.01	0.05	0.03	0.06
Pavements				0.01	0.04	0.07	0.06	0.07	0.05	0.05	0.07
Safety					0.09	0.09	0.28	0.06	0.23	0.17	0.05
Fumes						0.07	0.10	0.07	0.10	0.11	0.01
Parked Vehicles							0.14	0.06	0.10	0.14	0.04
Ease of Crossing								0.11	0.25	0.16	0.09
Shops Interesting									0.18	0.06	0.44
Fear										0.13	0.21
Amount of Traffic											0.06

LEWISHAM

Sample Size = 89

Threshold for Significance = 0.10 (5%)
0.12 (1%)

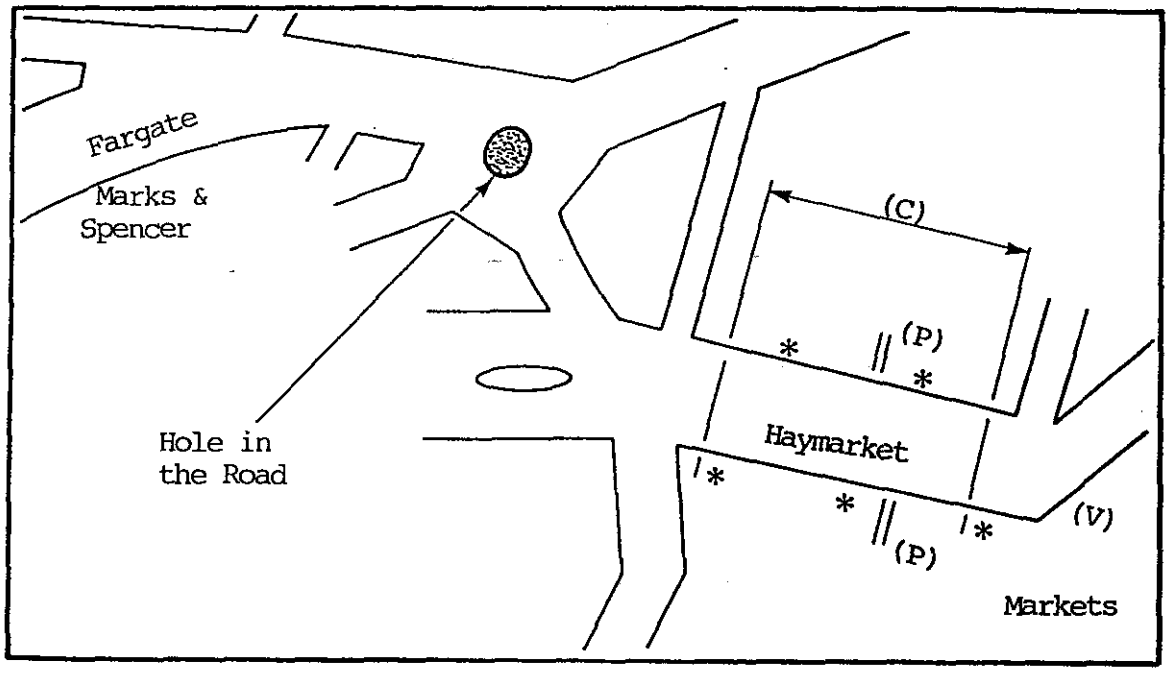
	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.11	0.13	0.03	0.15	0.09	0.09	0.16	0.24	0.10	0.17	0.26
Crowds		0.14	0.06	0.14	0.13	0.11	0.15	0.14	0.11	0.18	0.06
Noise			0.01	0.08	0.10	0.05	0.07	0.04	0.05	0.12	0.06
Pavements				0.02	0.08	0.07	0.04	0.03	0.01	0.01	0.03
Safety					0.07	0.14	0.34	0.14	0.22	0.22	0.06
Fumes						0.11	0.14	0.10	0.07	0.10	0.07
Parked Vehicles							0.21	0.05	0.18	0.16	0.04
Ease of Crossing								0.14	0.20	0.22	0.08
Shops Interesting									0.05	0.11	0.24
Fear										0.19	0.03
Amount of Traffic											0.04

EPSOM

Sample Size = 305

Threshold for Significance = 0.10 (5%)
0.12 (1%)

02 Haymarket - Sheffield



(V) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 15m
Pavement Width 6m

Traffic Conditions: Bus Priority
Other Vehicles Limited Access

Shopping Facilities: Markets
1 Department Store
Various Other Stores

Crossing Facilities: Pedestrian Bridge
Section of Road

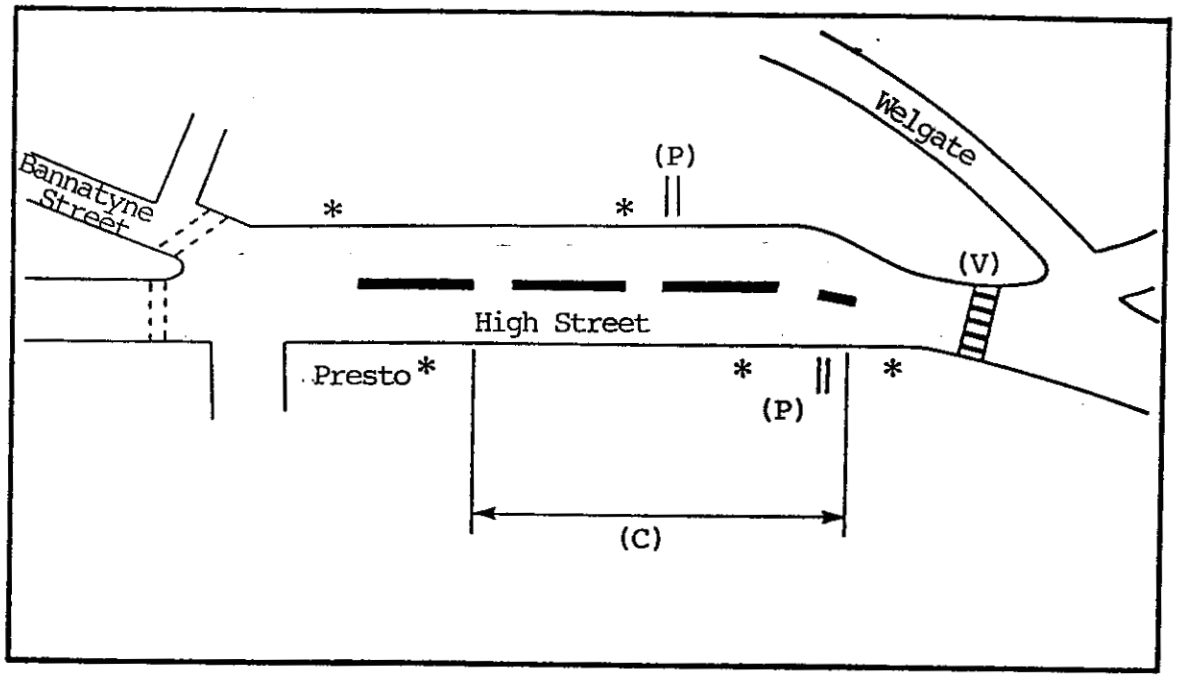
Comparison Streets: (1) Fargate
(2) Hole in the Road (Pedestrianised)

Surveys:

Video	✓	)
On Street Interviews	✓ 27/10/86	) 24, 25/10/86
Manual Classified Counts	✓ 27/10/86	)
CO, Noise	x	
Household Interviews	x	

Comments: 'Large Urban Depressed'

03 High Street - Lanark



(V) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 15m
Pavement Width 3m

Traffic Conditions: Dual Carriageway

Shopping Facilities: Various Small Shops
No Department Stores
1 Supermarket

Crossing Facilities: Pelican Crossing
Section of Road

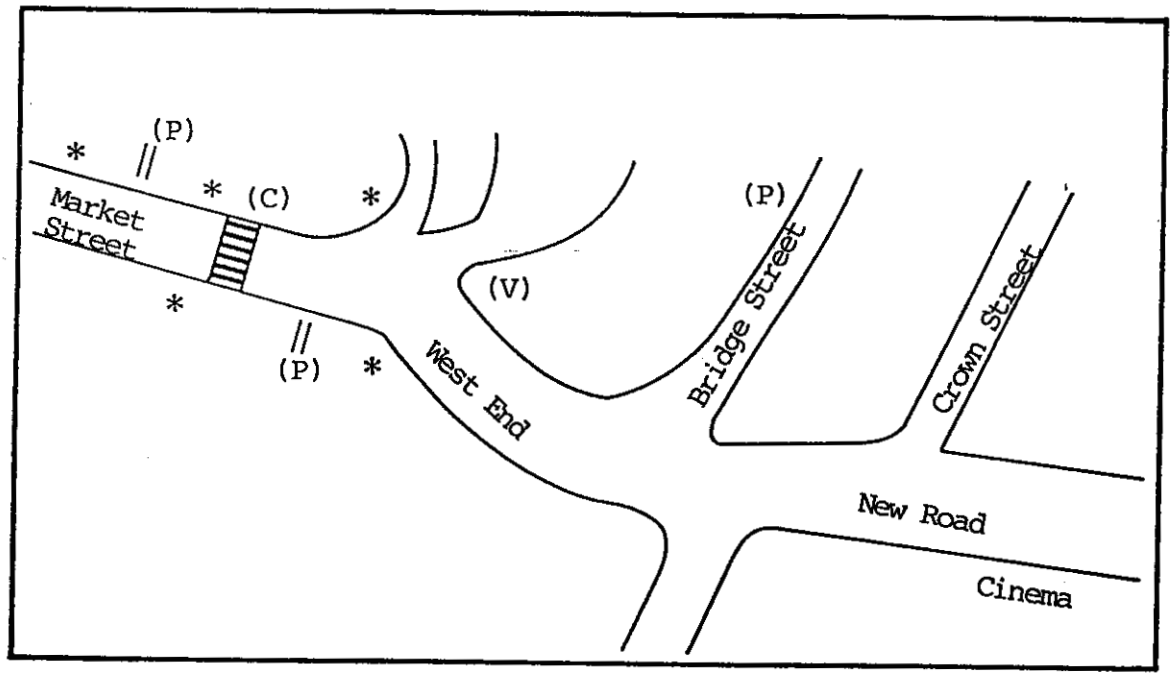
Comparison Streets: (1) Bannatyne Street
(2) Welgate

Surveys:

Video	✓	)
On Street Interviews	✓ 29/10/86	) 27, 28/10/86
Manual Classified Counts	✓ 29/10/86	)
CO, Noise	x	
Household Interviews	✓ From 2/3/87	

Comments: 'Small Urban Historic'

04 Market Street - Hebden Bridge



(V) Video Location
* Interview Staff

Pavement Counts | |(P)
Crossing Counts | |(C)

Road Width 9m
Pavement Width 3m

Traffic Conditions: Two Way
No Parking

Shopping Facilities: Two Way
No Parking

Shopping Facilities: Small Shops (mainly Banks, Tourist, etc)
1 Supermarket

Crossing Facilities: Pedestrian Crossing

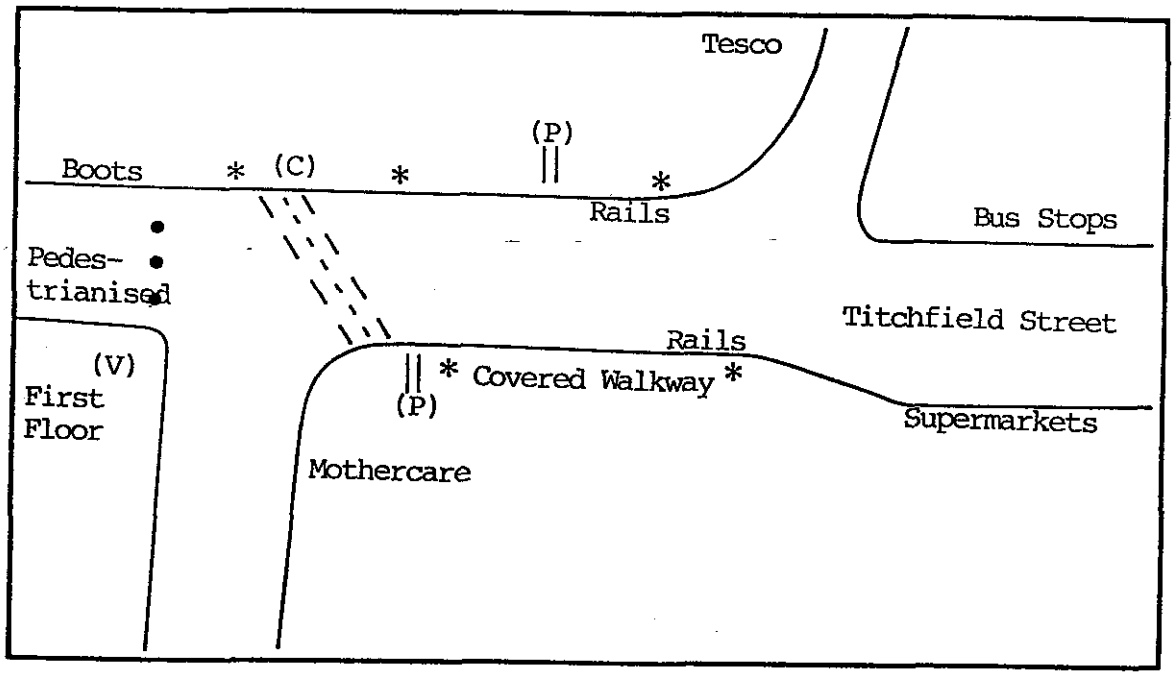
Comparison Streets: (1) Crown Street
(2) New Road

Surveys:

Video	✓	)
On Street Interviews	✓ 29/10/86	) 30, 31/10/86
Manual Classified Counts	✓ 29/10/86	)
CO, Noise	x	
Household Interviews	x	

Comments: 'District Centre'

05 King Street - Kilmarnock



(V) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 11m
Pavement Width 3m

Traffic Conditions: 1 Way King Street to St Marnock Street

Shopping Facilities: New Shopping Facilities
Varied

Crossing Facilities: Pelican

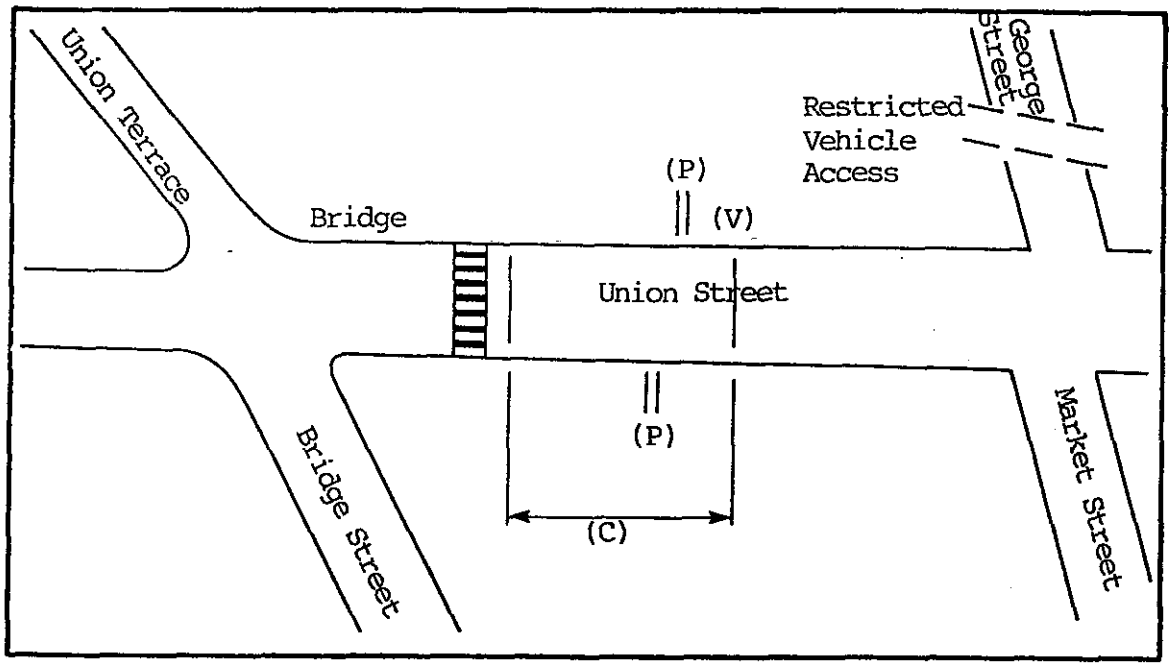
Comparison Streets: (1) King Street (Pedestrianised)
(2) Titchfield Street

Surveys:

Video	✓	)
On Street Interviews	✓ 1/11/86	) 30, 31/10/86
Manual Classified Counts	✓ 1/11/86	)
CO, Noise	x	
Household Interviews	x	

Comments: 'Small Urban Other'

06 Union Street - Aberdeen



(V) Video Location
* Interview Staff

Pavement Counts | |(P)
Crossing Counts | |(C)

Road Width 15m
Pavement Width 4m

Traffic Conditions: Two Way

Shopping Facilities: Non-Food Department Stores
Hotels
Various Others

Crossing Facilities: Pelican
Section of Road

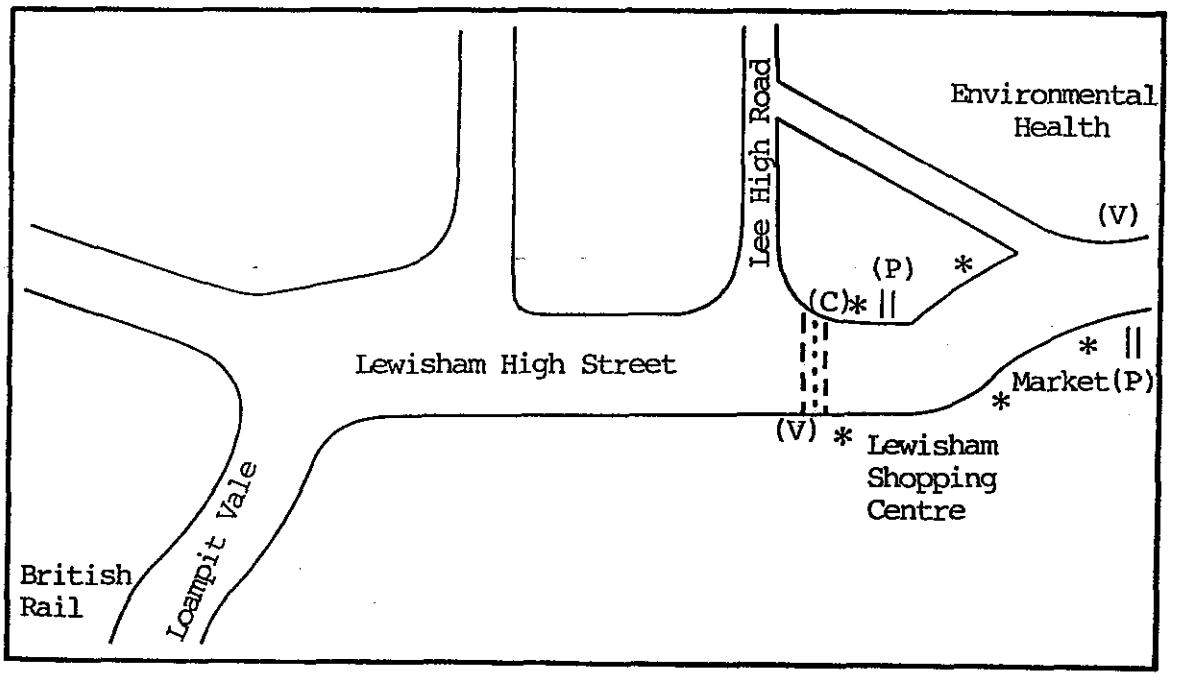
Comparison Streets: (1) Market Street
(2) George Street (Pedestrian Priority)

Surveys:

Video	✓	)
On Street Interviews	✓ 5/11/86	) 1, 3/11/86
Manual Classified Counts	✓ 5/11/86	)
CO, Noise	x	
Household Interviews	x	

Comments: 'Large Urban Active'

07 High Street - Lewisham



(V) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 15m
Pavement Width 4m

Traffic Conditions: Two Way

Shopping Facilities: Street Market
Major Shopping Centre
Various Shops

Crossing Facilities: Pelican

Comparison Streets: (1) Loampit Vale
(2) Lee High Road

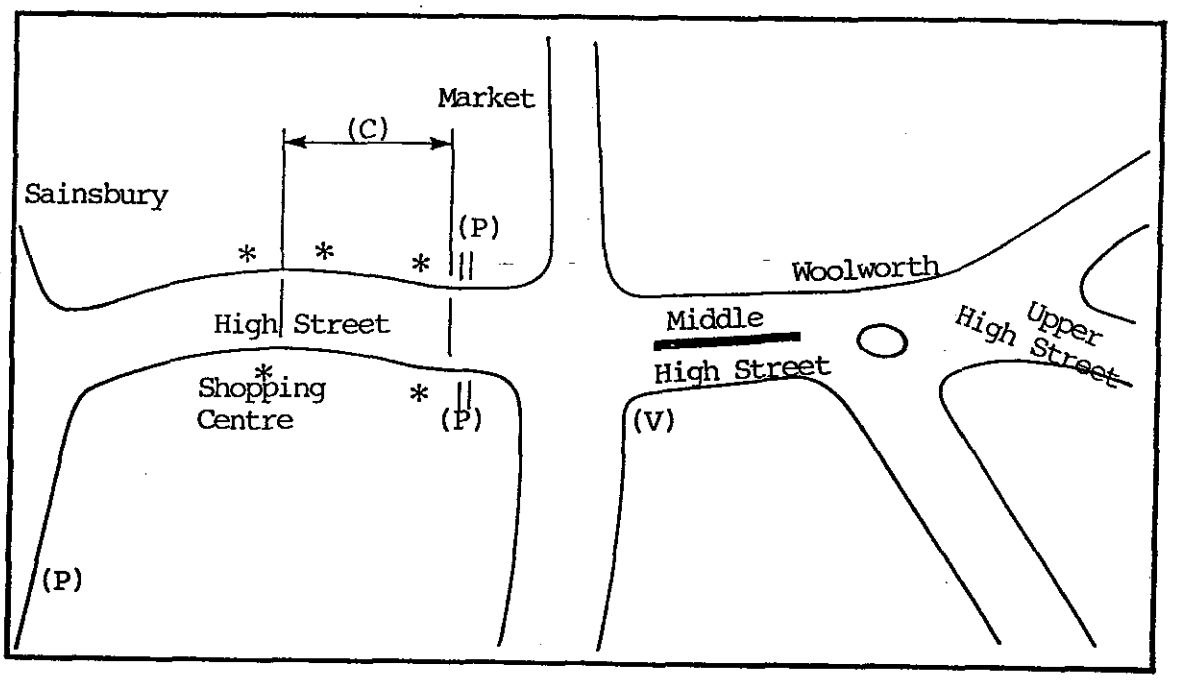
Surveys:

Video	✓	)
On Street Interviews	✓ 8/11/86	) 6, 7/11/86 *
Manual Classified Counts	✓ 8/11/86	)
CO, Noise	x 26, 27/2/87	
Household Interviews	x	

* then 26, 27/2/87

Comments: 'Large Urban Depressed'

08 Market Place - Epsom



(V) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 10m
Pavement Width 2m

Traffic Conditions: Two Way Flow

Shopping Facilities: Supermarkets
Markets
Shopping Centre

Crossing Facilities: Section of Road

Comparison Streets: (1) Middle High Street
(2) Upper High Street

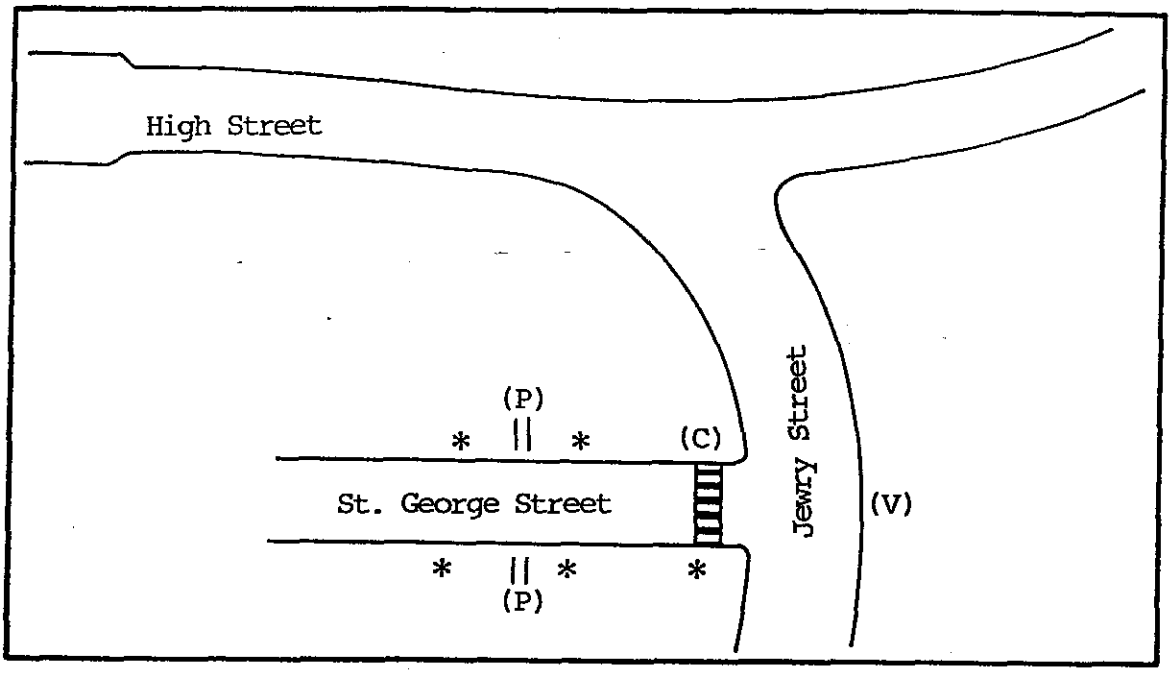
Surveys:

Video	✓	)
On Street Interviews	✓ 8/11/86	) 10, 11/11/86 *
Manual Classified Counts	✓ 8/11/86	)
CO, Noise	✓ 26, 27/3/86	
Household Interviews	x	

* then 18-21/2/87

Comments: 'Small Urban Other'

09 St Georges Street - Winchester



(V) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 10m
Pavement Width 3m

Traffic Conditions: One Way into Jewry Street

Shopping Facilities: Small Shops
No Supermarkets

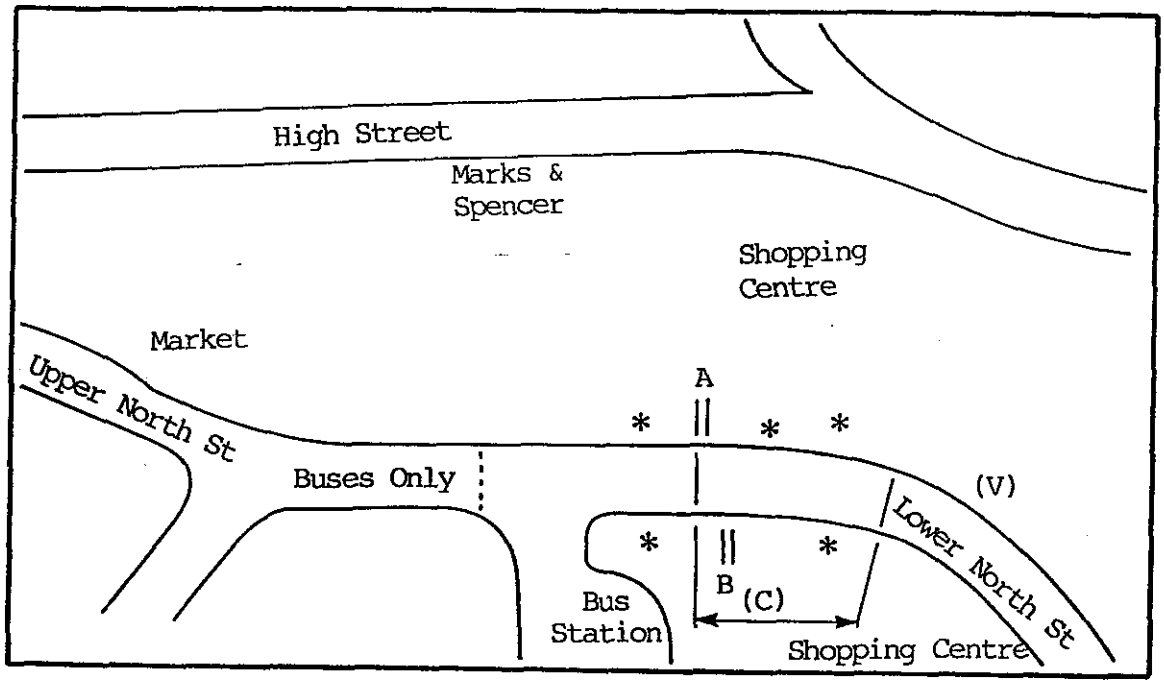
Crossing Facilities: Pelican at Junction

Comparison Streets: (1) High Street (Pedestrianised)
(2) Jewry Street

Surveys:			
	Video	✓	)
	On Street Interviews	✓ 14/11/86	) 12, 13/11/86
	Manual Classified Counts	✓ 14/11/86	)
	CO, Noise	x	
	Household Interviews	x	

Comments: 'Small Urban Historic'

10 Lower North Street - Guildford



(V) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 11m
Pavement Width 4m

Traffic Conditions: One Way

Shopping Facilities: 2 Shopping Centres
Markets

Crossing Facilities: Section of Road

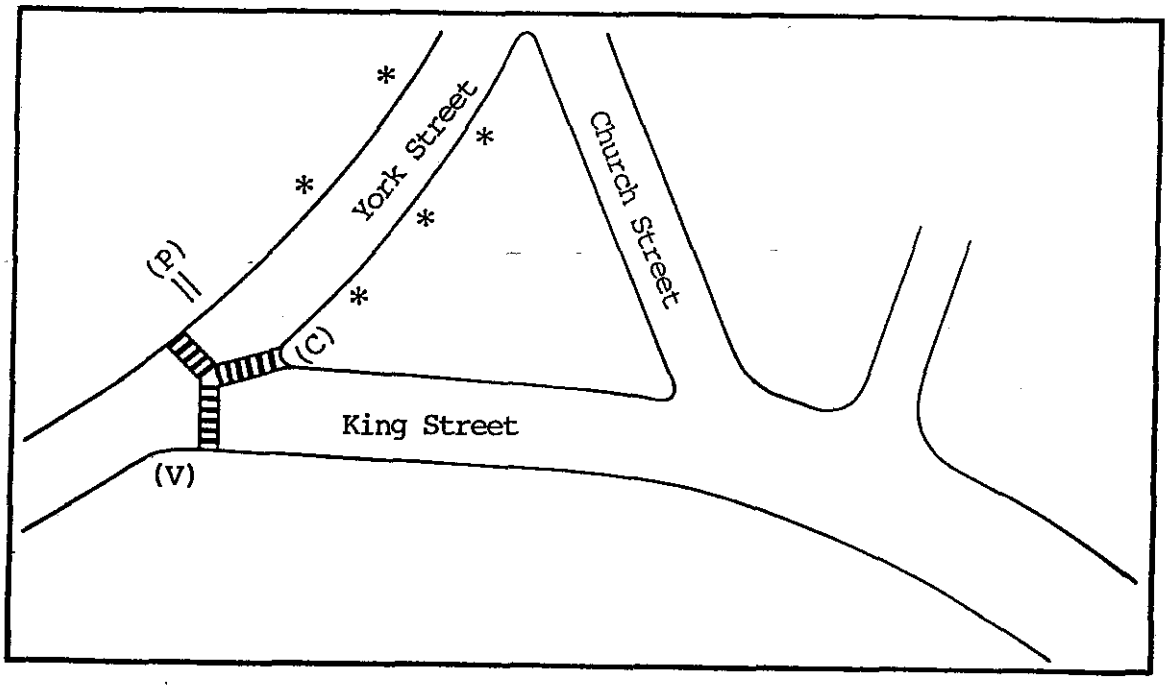
Comparison Streets: (1) Upper North Street
(2) High Street (Pedestrianised)

Surveys:			
	Video	✓	)
	On Street Interviews	✓ 17, 18/11/86	) 14, 15/11/86 *
	Manual Classified Counts	✓	)
	CO, Noise	x	
	Household Interviews	x	

* then 16-21/2/87

Comments: 'Small Urban Historic'

11 York Road - Twickenham



(V) Video Location
* Interview Staff

Pavement Counts || (P)
Crossing Counts || (C)

Road Width 10m
Pavement Width 2m

Traffic Conditions: Two Way Flow

Shopping Facilities: Small Shops
No Department Stores
1 Supermarket

Crossing Facilities: Pelican at Junction of York Street and King Street

Comparison Streets: (1) King Street
(2) Church Street

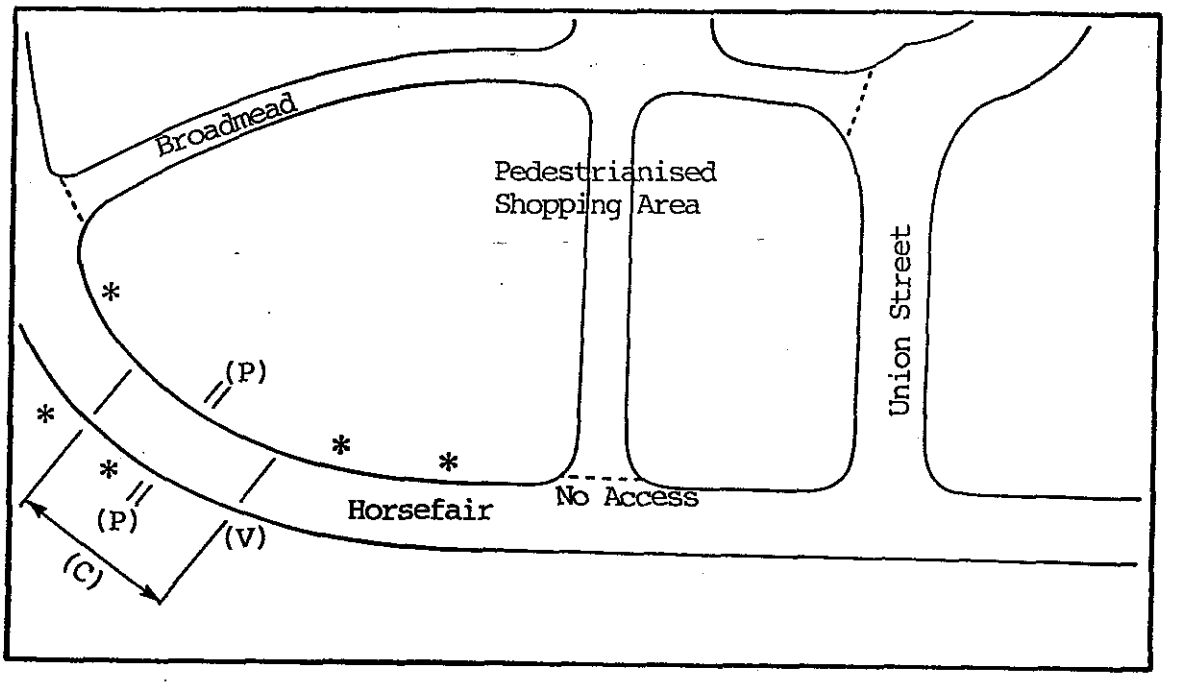
Surveys:

Video	✓	)
On Street Interviews	✓ 19/11/86	) 17, 18/11/86 *
Manual Classified Counts	✓ 19/11/86	)
CO, Noise	x	
Household Interviews	x	

* then 16, 17/2/87

Comments: 'District Centre'

12 The Horsefair - Bristol



(v) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 11m
Pavement Width 5m

Traffic Conditions: 1 Way along Horsefair

Shopping Facilities: Pedestrianised Central Area
Small National Chain Stores
2 Department Stores
Supermarkets

Crossing Facilities: Section of Road

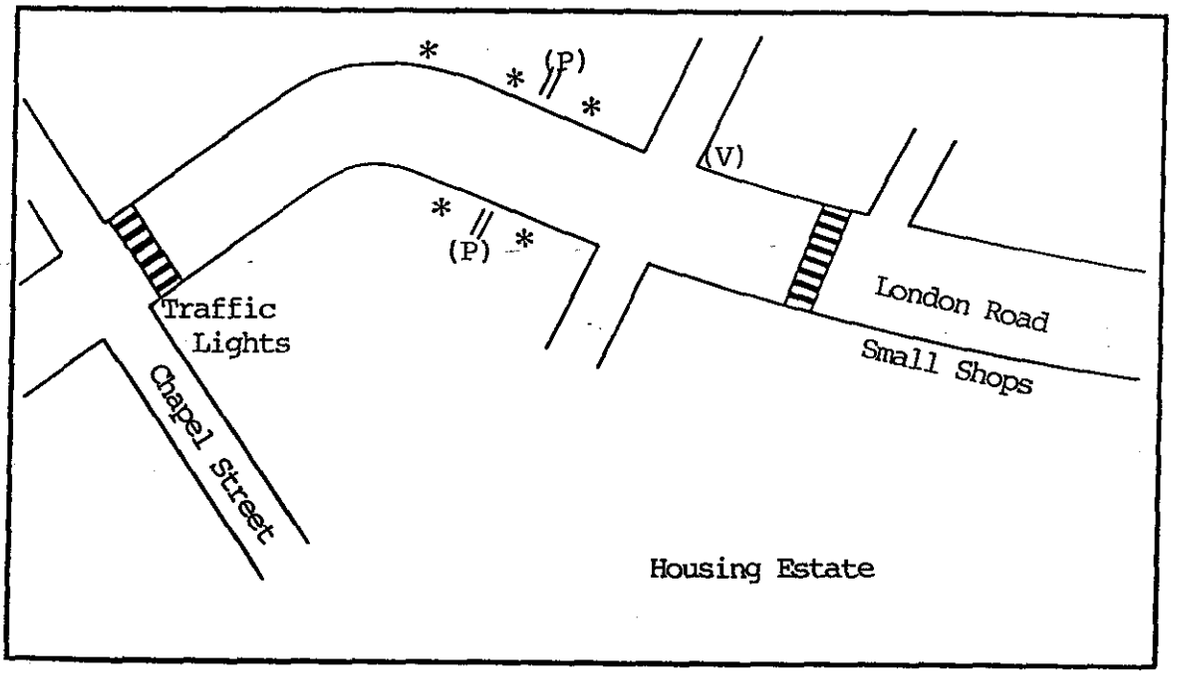
Comparison Streets: (1) Broadmead (Pedestrianised)
(2) Union Street

Surveys:

Video	✓)	
On Street Interviews	✓)	19, 20, 21/11/86
Manual Classified Counts	✓)	
CO, Noise	x	
Household Interviews	x	

Comments: 'Large Urban Active'

15 London Road - Hazel Grove



(V) Video Location
* Interview Staff

Pavement Counts || (P)
Crossing Counts || (C)

Road Width 10m
Pavement Width 2m

Traffic Conditions: Two Way Flow

Shopping Facilities: Small Shops
Banks
Grocery

Crossing Facilities: None

Comparison Streets: (1)) Not
(2)) Available

Surveys:

Video	✓	)
On Street Interviews	✓ 29/11/86	) 27, 28/11/86
Manual Classified Counts	✓ 29/11/86	)
CO, Noise	x	
Household Interviews	/ from 9/3/87	

Comments: 'District Centre'

Appendix 2: Interview Form

INSTITUTE FOR TRANSPORT STUDIES

PEDESTRIAN AMENITY QUESTIONNAIRE

	CODE	COL	SKIP TO
LOCATION: _____		(1-2)	
RECORD NO: _____		(3-5)	
CARD NUMBER: ONE		(6)	
DATE: __/__/86		(7-10)	
TIME (24 HOUR): _____		(11-14)	

INTRODUCTION

GOOD MORNING/GOOD AFTERNOON. WE ARE CARRYING OUT A SURVEY OF PEOPLES' VIEWS ABOUT CONDITIONS IN .... COULD YOU TELL ME .....

1. WHAT IS YOUR MAIN REASON FOR BEING HERE NOW? (ONE REASON ONLY) (15-16)

SHOPPING	1	PERSONAL BUSINESS	7
SHOPPING/TO WORK	2	TO SCHOOL/COLLEGE	8
SHOPPING/FROM WORK	3	FROM SCHOOL/COLLEGE	9
TO WORK	4	MEETING FRIENDS	10
LEAVING WORK	5	LEISURE	11
PART OF WORK	6	DAY VISITOR	12

OTHER (SPECIFY) .....

2. WHEREABOUTS DO YOU LIVE (PROBE FOR POSTAL CODE, STREET NAME OR TOWN) WRITE IN ..... (17-18)

3. FOR ABOUT HOW MANY YEARS HAVE YOU BEING COMING TO ..... (NAME TOWN) (19-22) IF 1ST VISIT GO TO Q 12

WRITE IN NUMBER OF YEARS ..... (MONTHS .....)

4. HOW DID YOU TRAVEL TO ..... (NAME TOWN) TODAY? (23)

CAR DRIVER	1
CAR PASSENGER	2
BUS	3
COACH	4
TRAIN/UNDERGROUND	5
TAXI	6
CYCLE	7
MOTORCYCLE	8
WALKED	9

5. WHERE DID YOU BEGIN THIS CURRENT WALK JOURNEY? (24-25)

(WRITE IN STREET NAME) .....

		CODE	COL	SKIP TO
6.	HOW MUCH TIME ALTOGETHER WILL YOU EXPECT TO HAVE SPENT WALKING ON THIS JOURNEY BY THE TIME IT ENDS? ..... HRS ..... MINS		(26-28)	
7.	ABOUT HOW MANY DAYS IN THE PAST TWO WEEKS HAVE YOU VISITED HERE?		(29)	
	FIRST TIME	1		
	1 - 2 DAYS	2		
	3 - 5 DAYS	3		
	6 -11 DAYS	4		
	EVERY DAY	5		
8.	QUESTION ONLY TO BE ASKED ON WEEKDAYS		(30)	
	WERE ANY OF THOSE DAYS A SATURDAY?			
	YES	1		
	NO	2		
	FROM Q 7			
9.	IS THIS MORE OR LESS OFTEN THAN USUAL OR IS IT FAIRLY TYPICAL?		(31)	
	MORE OFTEN	1		
	LESS OFTEN	2		
	FAIRLY TYPICAL	3		Q 11
10.	IF MORE OR LESS OFTEN AT Q 9		(32)	
	WHY HAVE YOU WALKED ALONG HERE MORE/LESS OFTEN THAN USUAL? (DO NOT PROMPT)			
	NO REASON	1		
	CHRISTMAS	2		
	BEEN ILL	3		
	BEEN AWAY	4		
	HAD PEOPLE STAYING	5		
	WITHOUT USUAL TRANSPORT	6		
	NEW SHOPS OPEN	7		
	TO DO WITH WORK	8		
	OTHER (SPECIFY)			
11.	AT WHAT TIME OF DAY DO YOU MOST OFTEN WALK ALONG HERE?		(33)	
	BEFORE 8.29 a.m.	1		
	8.30 - 9.29 a.m.	2		
	9.30 - 11.29 a.m.	3		
	11.30 - 1.59 p.m.	4		
	2.00 - 3.29 p.m.	5		
	3.30 - 5.00 p.m.	6		
	EVENING	7		
	VARIES	8		
12.	WHAT DO YOU THINK COULD BE DONE IN THIS STREET HERE TO IMPROVE CONDITIONS FOR PEDESTRIANS? (CIRCLE UP TO 3. DO NOT PROMPT)		(34-39)	
	NOTHING	1		
	SAFETY RAILINGS (IN)	2		
	EXTRA CROSSINGS	3		
	REDUCE OBSTRUCTIONS	4		
	MORE SEATS	5		
	IMPROVE SIGNS	6		
	TIDY LITTER	7		
	SAFETY RAILINGS (OUT)	8		
	REDUCE TRAFFIC SPEED	9		
	IMPROVE PAVEMENTS	10		
	TOILETS	11		
	RESTRICT TRAFFIC	12		
	BAN PARKED VEHICLES	13		
	OTHER(S)			

		CODE	COL	SKIP TO
13.	NOW I'D LIKE TO ASK YOU TO PICK A NUMBER FROM THIS SCALE (SHOW CARD A) WHICH DESCRIBES HOW YOU FEEL ABOUT CONDITIONS HERE FOR <u>YOU</u> AS A PEDESTRIAN		(40)	
	VERY BAD	1		
	BAD	2		
	FAIRLY BAD	3		
	NEITHER BAD/GOOD	4		
	FAIRLY GOOD	5		
	GOOD	6		
	VERY GOOD	7		
14.	HAVE YOU WALKED ALONG .....(B)..... (NAME STREET OR LANDMARK) WITHIN?		(41)	
	LAST WEEK	1		
	LAST MONTH	2		
	LAST YEAR	3		
	EVER	4		
	NEVER	5		Q.16 i)
15.	HAVE YOU WALKED ALONG .....(C)..... (NAME STREET OR LANDMARK) WITHIN?		(42)	
	LAST WEEK	1		
	LAST MONTH	2		
	LAST YEAR	3		
	EVER	4		
	NEVER	5		Q.16 i)
6.(i)	IF RESPONSE TO EITHER Q 14 OR Q 15 IS NEVER THEN PART (iii) REFERS TO THE STREET WHERE THE INTERVIEW IS TAKING PLACE ONLY. OTHERWISE.....			
(ii)	I'D NOW LIKE YOU TO THINK ABOUT CONDITIONS FOR PEDESTRIANS IN THIS STREET AND COMPARE THEM TO CONDITIONS .....(B)..... .....(NAME STREET) AND .....(C).....(NAME STREET)			
iii)	NOW I'LL GIVE YOU A LIST OF THINGS THAT ARE FEATURES IN ANY STREET LIKE THE SHOPS AND THE SAFTEY FOR PEDESTRIANS. I WOULD LIKE YOU TO PICK A NUMBER FROM THESE CARDS (SHOW CARDS) WHICH DESCRIBE HOW YOU FEEL ABOUT THE CONDITIONS AT EACH OF THE THREE SITES. THIS NUMBER SHOULD REFLECT HOW STRONGLY YOU FEEL ABOUT THE PARTICULAR FEATURE IN THOSE STREETS (IF NEVER TO Q 14 OR Q 15 THEN IN PLACE OF 'AT EACH OF THE THREE SITES' <u>READ</u> 'IN THIS STREET'			

17. NOW WOULD YOU PICK A NUMBER FROM THIS FIRST SCALE WHICH DESCRIBES HOW YOU FEEL ABOUT THIS FEATURE IN THIS STREET

(i) CODE IN GRID UNDER FIRST COLUMN (A)

AND WOULD YOU PICK A NUMBER FROM THIS FIRST SCALE WHICH DESCRIBES HOW YOU FEEL ABOUT THIS FEATURE IN .....(B).....

(ii) CODE IN GRID UNDER SECOND COLUMN (B)

AND WOULD YOU PICK A NUMBER FROM THIS FIRST SCALE WHICH DESCRIBES HOW YOU FEEL ABOUT THIS FEATURE IN .....(C).....

(iii) CODE IN GRID UNDER THIRD COLUMN (C)

(iv) REPEAT 17 (i), (ii), (iii) FOR TWO OTHER SCALES ON CARD 1

REPEAT 17 (i), (ii), (iii), (iv) WITH CARDS 2, 3, 4

		A	B	C	
1a	SHOPS AND BUILDINGS ARE UNATTRACTIVE/ SHOPS AND BULDINGS ARE ATTRACTIVE	☐	☐	☐	(43-45)
1b	PAVEMENTS OVERCROWDED WITH PEDESTRIANS/ ROOM ON PAVEMENTS FOR PEDESTRIANS	☐	☐	☐	(46-48)
1c	THE TRAFFIC IS NOISY/ THE TRAFFIC IS NOT NOISY	☐	☐	☐	(49-51)
2a	PAVEMENTS IN GOOD CONDITION/ PAVEMENTS IN POOR CONDITION	☐	☐	☐	(52-54)
2b	GENERALLY NOT SAFE CROSSING HERE/ GENERALLY SAFE CROSSING HERE	☐	☐	☐	(55-57)
2c	NO PROBLEM WITH TRAFFIC FUMES/ TRAFFIC FUMES VERY BAD	☐	☐	☐	(58-60)
3a	PARKED VEHICLES ARE NO PROBLEM/ PARKED VEHICLES ARE A PROBLEM	☐	☐	☐	(61-63)
3b	CROSSING THE ROAD IS EASY/ CROSSING THE ROAD IS DIFFICULT	☐	☐	☐	(64-66)
3c	SHOPS HERE ARE INTERESTING/ SHOPS HERE ARE UNINTERESTING	☐	☐	☐	(67-69)
4a	I DON'T FEEL SAFE FROM TRAFFIC/ I DO FEEL SAFE FROM TRAFFIC	☐	☐	☐	(70-72)
4b	THERE IS TOO MUCH TRAFFIC/ AMOUNT OF TRAFFIC IS NO PROBLEM	☐	☐	☐	(73-75)
4c	OVERALL I DON'T LIKE THIS STREET/ OVERALL I LIKE THIS STREET	☐	☐	☐	(76-78)

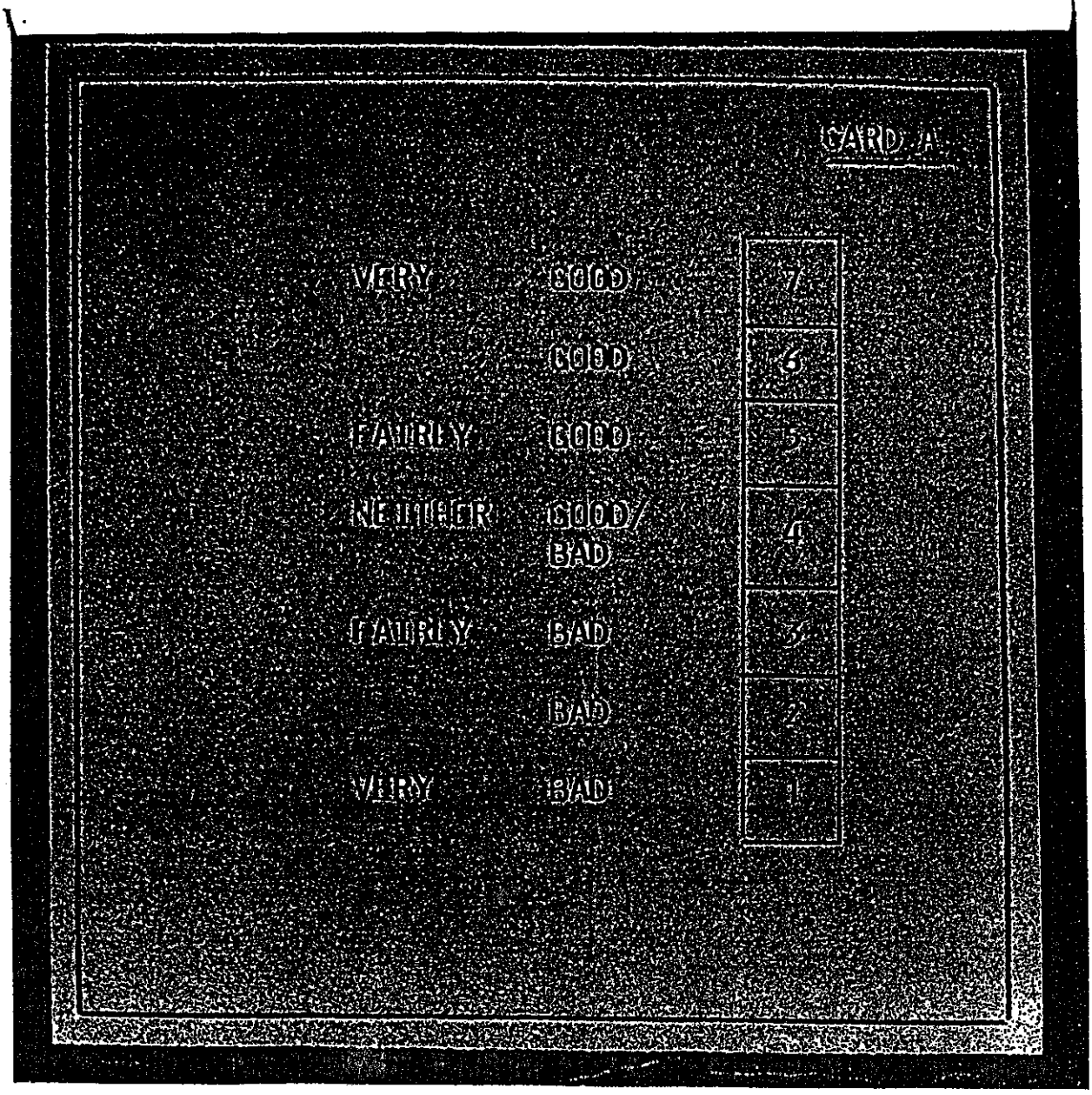
	CODE	COL	SKIP TO
LOCATION _____	[ ][ ]	(1-2)	
RECORD NO _____	[ ][ ][ ]	(3-5)	
CARD 2 TWO	[ ]	(6)	

18. FINALLY OF THE OVERALL LOCATIONS WE HAVE BEEN TALKING ABOUT WHICH DO YOU PREFER IN TERMS OF OVERALL QUALITY OF CONDITIONS FOR PEDESTRIANS

(i) WRITE IN	[ ]	(7)	
(ii) AND WHICH NEXT	[ ]	(8)	
(iii) WRITE IN THIRD LOCATION	[ ]	(9)	

(Q19) CLASSIFICATION DATA

AGE			
	UNDER 18	[1]	(10)
	18 - 65	[2]	
	OVER 65	[3]	
SEX			
	MALE	[1]	(11)
	FEMALE	[2]	
WALKING SITUATION			
	WITH CHILD IN PUSHCHAIR	[1]	(12-13)
	WITH CHILD WALKING	[2]	
	WITH MORE THAN ONE CHILD	[3]	
	WITH SHOPPING	[4]	
	WITH LUGGAGE	[5]	
	WITH BICYCLE	[6]	
	WITH ONE ADULT	[7]	
	WITH SEVERAL ADULTS	[8]	
	ALONE	[9]	
WALKING ABILITY			
	FULLY ABLE	[1]	(14)
	WALKING STICK	[2]	
	WHEELCHAIR	[3]	
	WALKING DIFFICULTY	[4]	
	STATED HEALTH PROBLEM	[5]	
OTHER (SPECIFY)			
INITIALS _____	[ ][ ]	(15-16)	
WEATHER _____	[ ]	(17)	


CARD A
VERY GOOD
GOOD
FAIRLY GOOD
NEITHER GOOD/ BAD
FAIRLY BAD
BAD
VERY BAD
7
6
5
4
3
2
1

CARD 1

a

SHOPS AND BUILDINGS ARE ATTRACTIVE

7	6	5	4	3	2	1

SHOPS AND BUILDINGS ARE UNATTRACTIVE

b

THERE IS ROOM ON THE PAVEMENTS FOR PEDESTRIANS

7	6	5	4	3	2	1

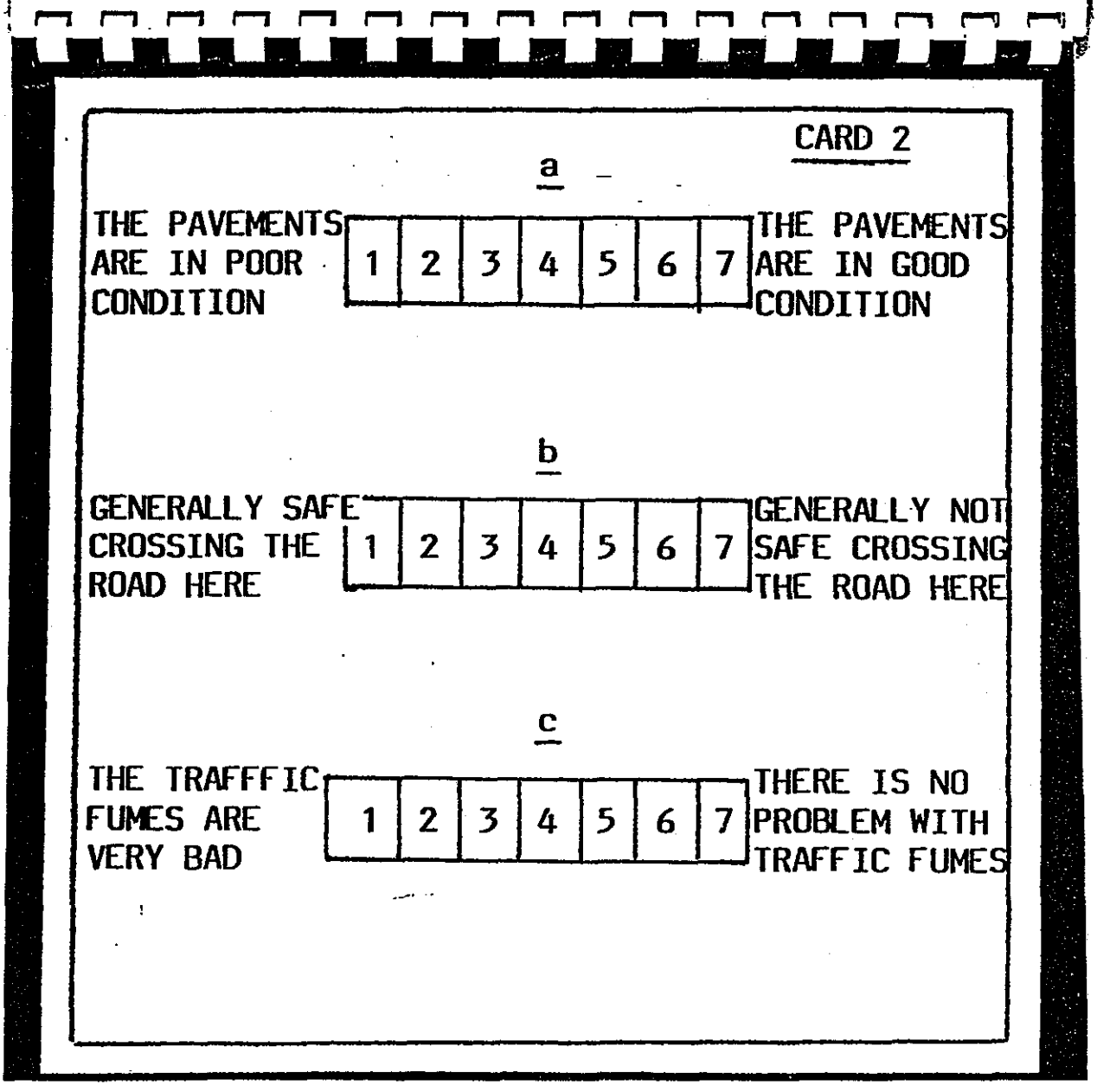
THE PAVEMENTS GET OVER - CROWDED WITH PEDESTRIANS

c

THE TRAFFIC IS NOT NOISY HERE

7	6	5	4	3	2	1

THE TRAFFIC IS NOISY HERE


CARD 2
a
THE PAVEMENTS ARE IN POOR CONDITION
1 2 3 4 5 6 7
THE PAVEMENTS ARE IN GOOD CONDITION
b
GENERALLY SAFE CROSSING THE ROAD HERE
1 2 3 4 5 6 7
GENERALLY NOT SAFE CROSSING THE ROAD HERE
c
THE TRAFFFIC FUMES ARE VERY BAD
1 2 3 4 5 6 7
THERE IS NO PROBLEM WITH TRAFFIC FUMES

CARD 3

a

PARKED VEHICLES CAUSE OBSTRUCTION

7	6	5	4	3	2	1

PARKED VEHICLES ARE NO PROBLEM

b

CROSSING THE ROAD HERE IS DIFFICULT

7	6	5	4	3	2	1

CROSSING THE ROAD HERE IS EASY

c

THE SHOPS HERE ARE NOT INTERESTING

7	6	5	4	3	2	1

THE SHOPS HERE ARE INTERESTING

CARD 4

a

I FEEL SAFE FROM TRAFFIC HERE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | I DON'T FEEL SAFE FROM TRAFFIC HERE

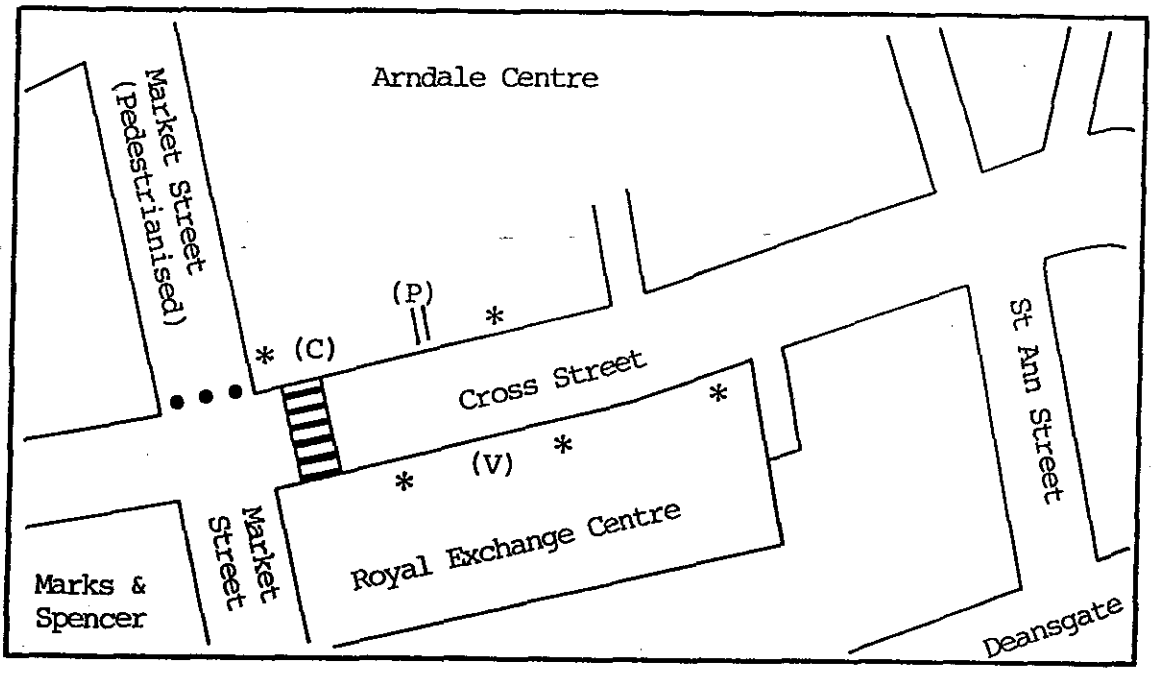
b

THE AMOUNT OF TRAFFIC IS NO PROBLEM | 1 | 2 | 3 | 4 | 5 | 6 | 7 | THERE IS TOO MUCH TRAFFIC HERE

c

OVERALL I LIKE THIS STREET | 1 | 2 | 3 | 4 | 5 | 6 | 7 | OVERALL I DON'T LIKE THIS STREET

13 Cross Street - Manchester



(V) Video Location
* Interview Staff

Pavement Counts || (P)
Crossing Counts || (C)

Road Width 10m
Pavement Width 3m

Traffic Conditions: 2 Way Flow

Shopping Facilities: Arndale Centre
Exchange Centre
Department Stores

Crossing Facilities: Pedestrian Crossing

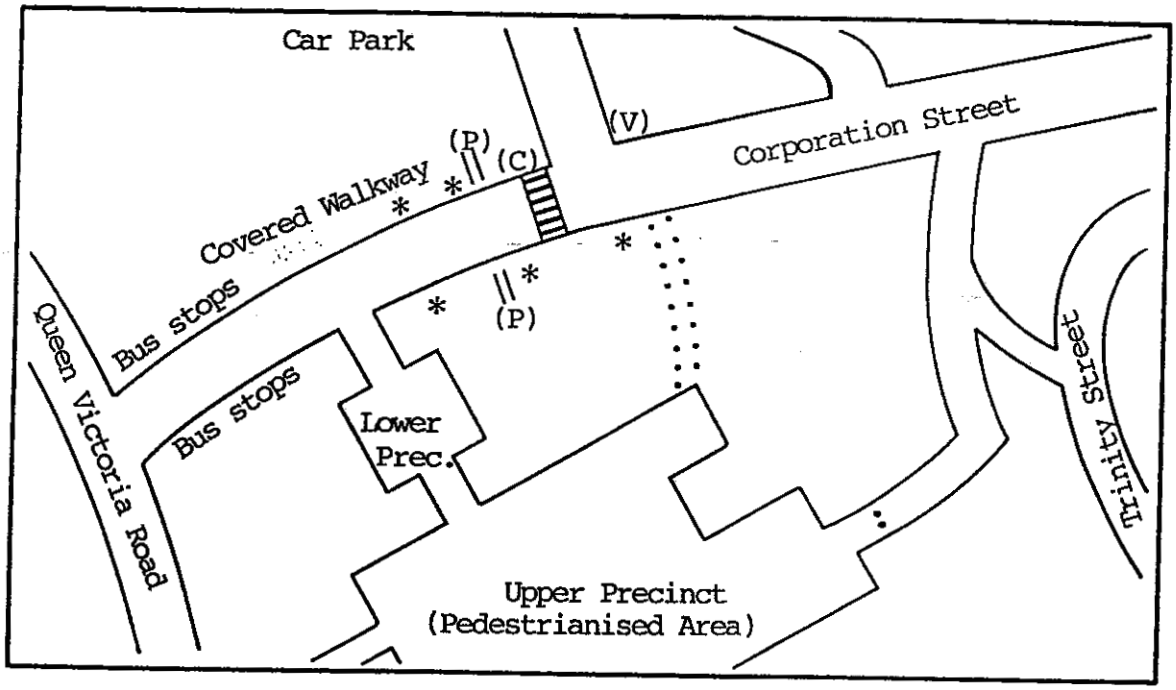
Comparison Streets: (1) Deansgate
(2) Market Street (Pedestrianised)

Surveys:

Video	✓ 14, 15/5/86	)
On Street Interviews	✓ 22/11/86	) 20, 21/11/86
Manual Classified Counts	✓ 22/11/86	)
CO, Noise	✓ 6/3/87	
Household Interviews	x	

Comments: 'Large Urban Active'

14 Corporation Street - Coventry



(V) Video Location
* Interview Staff

Pavement Counts | | (P)
Crossing Counts | | (C)

Road Width 15m
Pavement Width 4m

Traffic Conditions: Two Way Flow

Shopping Facilities: Small Shops
Access to Pedestrianised Central Area

Crossing Facilities: Pedestrian Crossing

Comparison Streets: (1) Lower Precinct (Pedestrianised)
(2) Trinity Street

Surveys:			
	Video	✓	)
	On Street Interviews	✓ 26/11/86	) 24, 25/11/86
	Manual Classified Counts	✓ 26/11/86	)
	CO, Noise	x	
	Household Interviews	x	

Comments: 'Large Urban Depressed'

Appendix 3. Site Congestion Factors

As noted in Sections 3.2 and 3.3, volume/capacity ratios were estimated for each interview street as measures of congestion levels. Capacities, as indicated in Table A1, were derived from the design flows in Table A2 and the road types and widths for the sites concerned.

Table A1

Site Saturation Flows

	Site	Road Type	Road Width (m)	* Capacity (veh/hr)	HGV's (%)	* Corrected capacity (veh/hr)
01	Chesterfield	2 LC	7.3	1700	13	1700
02	Sheffield	UC 4	14.6	4200	5	4200
03	Lanark	DC 4	14.6 +	3800	25	3200
04	Hebden Bridge	2 LC	9.0	2200	25	1975
05	Kilmarnock	1 WS	11.0	3550	16	3450
06	Aberdeen	2 LC	10.0	2500	5	2500
07	Lewisham	UC 4	14.6	4200	21	3975
08	Epsom	2 LC	10.0	2500	16	2350
09	Winchester	1 WS	10.0	3250	12	3250
10	Guildford	1 WS	11.0	3550	11	3550
11	Twickenham	2 LC	10.0	2500	16	2350
12	Bristol	1 WS	11.0	3550	13	3550
13	Manchester	2 LC	10.0	2500	13	2550
14	Coventry	UC 4	14.6	4200	10	4200
15	Hazel Grove	UC 4	10.0	3400	25	3175

NB: Road Type:

2 LC - 2 Lane Carriageway
UC 4 - Undivided Carriageway (4 Lane)
UC 6 - Undivided Carriageway (6 Lane)
1 WS - 1 Way Street
DC 4 - Divided Carriageway (4 lane)

* Both directions of flow.

\+ Lanark has a dual carriageway main street with unrestricted parking available. Flows are those associated with a 4 lane undivided carriageway effective road width = 13.5m.

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.14	0.55	0.32	0.39	0.48	0.45	0.44	0.50	0.40	0.60	0.59
Crowds		0.11	0.13	0.16	0.08	0.11	0.14	0.12	0.16	0.10	0.16
Noise			0.36	0.48	0.55	0.47	0.55	0.48	0.51	0.65	0.58
Pavements				0.32	0.32	0.24	0.32	0.28	0.32	0.37	0.30
Safety					0.43	0.36	0.60	0.37	0.53	0.57	0.47
Fumes						0.45	0.46	0.41	0.43	0.60	0.47
Parked Vehicles							0.42	0.41	0.41	0.54	0.45
Ease of Crossing								0.42	0.57	0.61	0.51
Shops Interesting									0.37	0.50	0.56
Fear										0.56	0.48
Amount of Traffic											0.63

WINCHESTER

Sample Size = 289

Threshold for Significance = 0.11 (5%)
0.14 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.30	0.22	0.18	0.42	0.25	0.34	0.39	0.31	0.40	0.45	0.44
Crowds		0.19	0.14	0.35	0.21	0.30	0.30	0.13	0.31	0.36	0.26
Noise			0.16	0.20	0.19	0.21	0.17	0.15	0.20	0.23	0.16
Pavements				0.11	0.11	0.15	0.18	0.15	0.19	0.19	0.14
Safety					0.31	0.48	0.57	0.28	0.54	0.60	0.42
Fumes						0.35	0.34	0.16	0.34	0.41	0.24
Parked Vehicles							0.51	0.24	0.47	0.56	0.40
Ease of Crossing								0.35	0.59	0.66	0.47
Shops Interesting									0.32	0.35	0.32
Fear										0.64	0.43
Amount of Traffic											0.52

GUILDFORD

Sample Size = 429

Threshold for Significance = 0.09 (5%)
0.12 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.11	0.01	0.14	0.28	0.36	0.16	0.35	0.47	0.21	0.27	0.58
Crowds		0.04	0.01	0.07	0.07	0.16	0.05	0.10	0.05	0.03	0.10
Noise			0.07	0.01	0.01	0.02	0.02	0.01	0.07	0.01	0.01
Pavements				0.03	0.07	0.02	0.08	0.11	0.08	0.04	0.16
Safety					0.24	0.03	0.36	0.29	0.26	0.23	0.30
Fumes						0.08	0.29	0.33	0.19	0.31	0.35
Parked Vehicles							0.01	0.11	0.06	0.01	0.13
Ease of Crossing								0.33	0.32	0.32	0.36
Shops Interesting									0.24	0.23	0.53
Fear										0.30	0.29
Amount of Traffic											0.31

TWICKENHAM

Sample Size = 247

Threshold for Significance = 0.11 (5%)
0.14 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.10	0.10	0.12	0.00	0.11	0.03	0.01	0.06	0.08	0.02	0.09
Crowds		0.11	0.06	0.02	0.11	0.03	0.04	0.10	0.02	0.05	0.09
Noise			0.23	0.01	0.45	0.05	0.01	0.09	0.02	0.03	0.00
Pavements				0.08	0.16	0.07	0.10	0.00	0.10	0.13	0.07
Safety					0.10	0.55	0.56	0.12	0.52	0.57	0.22
Fumes						0.03	0.07	0.00	0.08	0.04	0.07
Parked Vehicles							0.58	0.09	0.55	0.52	0.20
Ease of Crossing								0.08	0.56	0.64	0.19
Shops Interesting									0.11	0.07	0.19
Fear										0.63	0.20
Amount of Traffic											0.26

BRISTOL

Sample Size = 221

Threshold for Significance = 0.10 (5%)
0.12 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.11	-0.09	0.11	0.09	0.05	0.09	0.12	0.29	0.15	0.15	0.36
Crowds		-0.05	0.09	0.03	0.02	0.09	0.05	0.05	0.03	0.08	0.12
Noise			-0.26	-0.41	0.27	-0.32	-0.49	-0.17	-0.47	-0.59	-0.18
Pavements				0.22	-0.18	0.28	0.30	0.13	0.26	0.31	0.13
Safety					0.31	0.34	0.52	0.14	0.52	0.57	0.16
Fumes						0.20	0.34	0.12	0.25	0.33	0.14
Parked Vehicles							0.40	0.14	0.35	0.44	0.17
Ease of Crossing								0.20	0.59	0.67	0.23
Shops Interesting									0.22	0.20	0.33
Fear										0.64	0.26
Amount of Traffic											0.24

MANCHESTER

Sample Size = 309

Threshold for Significance = 0.09 (5%)
0.12 (1%)

	Crowds	Noise	Pavements	Safety	Fumes	Parked Vehicles	Ease of Crossing	Shops Interesting	Fear	Amount of Traffic	Like to Visit
Shops	0.07	0.16	0.11	0.17	0.20	0.12	0.19	0.24	0.19	0.20	0.26
Crowds		0.25	0.10	0.19	0.15	0.16	0.20	0.05	0.22	0.21	0.09
Noise			0.14	0.41	0.37	0.29	0.15	0.25	0.40	0.51	0.28
Pavements				0.13	0.17	0.12	0.21	0.10	0.17	0.21	0.14
Safety					0.33	0.35	0.58	0.22	0.54	0.55	0.30
Fumes						0.25	0.41	0.22	0.37	0.38	0.20
Parked Vehicles							0.45	0.20	0.38	0.41	0.21
Ease of Crossing								0.30	0.50	0.62	0.33
Shops Interesting									0.22	0.27	0.30
Fear										0.60	0.32
Amount of Traffic											0.35

COVENTRY

Sample Size = 364

Threshold for Significance = 0.10 (5%)
0.11 (1%)

APPENDIX 5

LOCATION: 01 CHESTERFIELD

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.81	-0.34		0.77
Pavements Crowded	0.36	0.55		0.43
Noise from Traffic	0.80	-0.27		0.72
Pavement Quality	0.28	0.68		0.55
General Safety	0.72	-0.04		0.53
Traffic Fumes	-0.78	0.02		0.61
Parked Vehicles	-0.40	-0.67		0.61
Ease of Crossing the Road	0.84	-0.12		0.72
Shops Interesting	0.73	0.34		0.66
Fear of Traffic	0.88	-0.04		0.78
Amount of Traffic	0.87	-0.12		0.78
Like to Visit	0.83	0.25		0.76
Total Communality Variance of Factor	6.33	1.64		7.98

LOCATION: 02 SHEFFIELD

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.49	0.77		0.84
Pavements Crowded	0.68	0.14		0.48
Noise from Traffic	0.88	0.22		0.82
Pavement Quality	0.54	0.07		0.30
General Safety	0.89	0.02		0.80
Traffic Fumes	0.79	0.03		0.62
Parked Vehicles	0.71	-0.33		0.62
Ease of Crossing the Road	0.93	0.09		0.87
Shops Interesting	0.41	0.78		0.78
Fear of Traffic	0.93	0.08		0.87
Amount of Traffic	0.94	0.08		0.90
Like to Visit	0.48	0.76		0.81
Total Communality Variance of Factor	6.76	2.02		8.7

LOCATION: 03 LANARK

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.6	0.42	0.12	0.64
Pavements Crowded	0.72	0.03	0.00	0.54
Noise from Traffic	0.15	0.29	0.63	0.61
Pavement Quality	0.70	0.0	0.06	0.56
General Safety	0.43	0.33	0.55	0.61
Traffic Fumes	0.38	0.52	0.21	0.88
Parked Vehicles	0.43	0.23	0.07	0.36
Ease of Crossing the Road	0.53	0.46	-0.32	0.60
Shops Interesting	0.41	0.58	0.10	0.73
Fear of Traffic	0.66	0.05	0.11	0.46
Amount of Traffic	0.36	0.2	0.53	0.48
Like to Visit	0.59	0.31	0.06	0.47
Total Communality Variance of Factor	3.32	1.43	1.21	6.98

LOCATION: 04 HEBDEN BRIDGE

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.84	-0.21	0.10	0.76
Pavements Crowded	0.13	0.79	0.33	0.75
Noise from Traffic	0.94	-0.05	-0.14	0.91
Pavement Quality	-0.22	0.12	0.85	0.78
General Safety	-0.84	-0.10	-0.08	0.72
Traffic Fumes	0.82	-0.02	-0.26	0.74
Parked Vehicles	0.45	-0.65	0.32	0.72
Ease of Crossing the Road	0.86	-0.11	-0.10	0.76
Shops Interesting	0.67	0.39	-0.36	0.73
Fear of Traffic	0.88	-0.05	-0.03	0.78
Amount of Traffic	0.92	-0.03	0.02	0.85
Like to Visit	0.85	0.14	-0.16	0.77
Total Communality Variance of Factor	6.82	1.32	1.22	9.34

LOCATION: 05 KILMARNOCK

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.93			0.86
Pavements Crowded	0.63			0.40
Noise from Traffic	0.93			0.87
Pavement Quality	0.97			0.94
General Safety	0.93			0.94
Traffic Fumes	0.91			0.82
Parked Vehicles	0.90			0.82
Ease of Crossing the Road	0.97			0.95
Shops Interesting	0.92			0.86
Fear of Traffic	0.96			0.93
Amount of Traffic	0.98			0.96
Like to Visit	0.96			0.93
Total Communality				10.35
Variance of Factor	10.35			

LOCATION: 06 ABERDEEN

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.25	-0.62	-0.05	0.95
Pavements Crowded	0.82	0.27	0.18	0.78
Noise from Traffic	0.83	-0.16	-0.12	0.78
Pavement Quality	0.10	0.11	0.78	0.65
General Safety	-0.71	-0.43	0.15	0.71
Traffic Fumes	0.62	0.47	0.00	0.60
Parked Vehicles	0.69	0.26	-0.71	0.57
Ease of Crossing the Road	0.77	0.46	0.05	0.81
Shops Interesting	-0.61	0.69	0.13	0.86
Fear of Traffic	0.59	0.54	-0.03	0.64
Amount of Traffic	0.92	0.14	0.01	0.98
Like to Visit	-0.57	0.73	0.08	0.86
Total Communality				9.20
Variance of Factor	5.31	2.51	1.40	

LOCATION: 07 LEWISHAM

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.54	-0.74	-0.07	0.85
Pavements Crowded	0.40	0.55	-0.08	0.47
Noise from Traffic	0.30	0.05	0.82	0.77
Pavement Quality	0.64	0.12	0.43	0.61
General Safety	0.72	-0.23	0.13	0.59
Traffic Fumes	0.60	0.14	0.33	0.50
Parked Vehicles	0.33	-0.50	-0.26	0.43
Ease of Crossing the Road	0.81	-0.01	0.19	0.70
Shops Interesting	0.42	0.79	-0.04	0.81
Fear of Traffic	0.76	0.02	0.16	0.60
Amount of Traffic	0.59	-0.44	-0.15	0.57
Like to Visit	0.35	0.74	-0.24	0.73
Total Communality				7.69
Variance of Factor	3.86	2.60	1.23	

LOCATION: 08 EPSOM

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.64	-0.53	-0.03	0.70
Pavements Crowded	0.71	-0.30	-0.24	0.67
Noise from Traffic	0.67	-0.13	-0.41	0.63
Pavement Quality	0.25	-0.32	0.70	0.66
General Safety	0.75	-0.02	0.02	0.57
Traffic Fumes	0.60	-0.21	0.12	0.43
Parked Vehicles	0.46	0.23	-0.49	0.51
Ease of Crossing the Road	0.75	0.01	-0.18	0.60
Shops Interesting	-0.62	0.46	0.16	0.63
Fear of Traffic	0.56	0.10	0.27	0.40
Amount of Traffic	0.69	0.29	0.21	0.61
Like to Visit	-0.33	0.77	0.06	0.71
Total Communality				7.15
Variance of Factor	4.48	1.51	1.15	

LOCATION: 09 WINCHESTER

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.96			0.92
Pavements Crowded	0.55			0.30
Noise from Traffic	0.97			0.95
Pavement Quality	0.87			0.76
General Safety	0.94			0.90
Traffic Fumes	0.95			0.91
Parked Vehicles	0.93			0.86
Ease of Crossing the Road	0.96			0.93
Shops Interesting	0.93			0.87
Fear of Traffic	0.95			0.91
Amount of Traffic	0.98			0.97
Like to Visit	0.96			0.93
Total Communality				10.25
Variance of Factor	10.25			

LOCATION: 10 GUILDFORD

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.93			0.87
Pavements Crowded	0.86			0.74
Noise from Traffic	0.95			0.91
Pavement Quality	0.71			0.50
General Safety	0.96			0.94
Traffic Fumes	0.89			0.79
Parked Vehicles	0.94			0.88
Ease of Crossing the Road	0.97			0.94
Shops Interesting	0.79			0.63
Fear of Traffic	0.96			0.93
Amount of Traffic	0.98			0.96
Like to Visit	0.90			0.82
Total Communality				9.98
Variance of Factor	9.98			

LOCATION: 11 TWICKENHAM

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.92	0.10		0.85
Pavements Crowded	0.34	0.82		0.80
Noise from Traffic	0.85	0.07		0.73
Pavement Quality	0.56	0.01		0.31
General Safety	0.76	0.09		0.5
Traffic Fumes	0.84	0.17		0.74
Parked Vehicles	0.46	0.67		0.66
Ease of Crossing the Road	0.87	0.13		0.77
Shops Interesting	0.88	0.11		0.79
Fear of Traffic	0.63	0.44		0.59
Amount of Traffic	0.78	0.28		0.70
Like to Visit	0.92	0.10		0.86
Total Communality				8.44
Variance of Factor	6.93	1.50		

LOCATION: 12 BRISTOL

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.50	0.22	-0.59	0.65
Pavements Crowded	0.43	0.08	-0.47	0.42
Noise from Traffic	0.65	0.40	0.43	0.73
Pavement Quality	0.70	0.07	0.10	0.51
General Safety	0.89	0.22	0.00	0.84
Traffic Fumes	0.42	0.52	0.49	0.74
Parked Vehicles	0.91	0.20	-0.06	0.88
Ease of Crossing the Road	0.91	0.26	0.00	0.90
Shops Interesting	0.18	0.77	0.28	0.72
Fear of Traffic	0.91	0.21	0.00	0.87
Amount of Traffic	0.84	0.21	-0.01	0.93
Like to Visit	0.47	-0.51	0.22	0.54
Total Communality				8.85
Variance of Factor	6.05	1.63	1.16	

LOCATION: 13 MANCHESTER

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.61	0.64		0.79
Pavements Crowded	0.48	0.26		0.30
Noise from Traffic	0.88	0.20		0.82
Pavement Quality	0.82	-0.11		0.69
General Safety	0.88	0.25		0.84
Traffic Fumes	0.80	-0.22		0.69
Parked Vehicles	0.81	0.14		0.67
Ease of Crossing the Road	0.93	0.19		0.91
Shops Interesting	0.55	-0.64		0.72
Fear of Traffic	0.92	0.12		0.87
Amount of Traffic	0.95	0.18		0.94
Like to Visit	0.63	-0.63		0.79
Total Communality Variance of Factor	7.52	1.59		9.11

LOCATION: 14 COVENTRY

	First Factor	Second Factor	Third Factor	Total Communality of Construct
Attribute:				
Shops Attractiveness	0.70			0.49
Pavements Crowded	0.69			0.48
Noise from Traffic	0.92			0.85
Pavement Quality	0.66			0.44
General Safety	0.92			0.86
Traffic Fumes	0.89			0.79
Parked Vehicles	0.84			0.71
Ease of Crossing the Road	0.96			0.98
Shops Interesting	0.73			0.58
Fear of Traffic	0.94			0.89
Amount of Traffic	0.96			0.92
Like to Visit	0.80			0.65
Total Communality Variance of Factor	8.59			8.59

APP5.245
pgh/plh (D17)