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CAR SHARING AND PEAK SPREADING STUDIES IN SHEFFIELD

Final Report

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1. INTRODUCTION

1.1 Background

This Study of two firms in Sheffield city centre has been carried out under a contract with LTR2 Division of the Department of Transport, dated 28th March 1980. The Department of Transport has been interested for some time in various aspects of car-sharing, and the impact on car sharing of different work hour arrangements, and had previously carried out surveys of car-sharers in Government offices at Longbenton, Newcastle upon Tyne (TAU 1977) and Llanishen, Cardiff (TAU 1979) where flexible working hours were in operation. This study was designed as a continuation of those studies, in a city centre area where car parking was severely restricted. The prime objective was to measure levels of car sharing in locations with higher levels of public transport provision but more restricted parking, for later comparison with the results from Longbeutzen and Llanishen.

The need for the study was occasioned by the desire to know more about the factors which influence people to share cars, and the characteristics of existing spontaneously formed car-sharing arrangements and participants. To obtain this information, details of the travel and work habits of the workforce concerned had to be collected and analysed. It was considered useful to try to establish any characteristics common to ad-hoc car-sharing participants as a basis for suggesting possible causal factors.

The form of the study, in terms of the type of data collected, and its subsequent tabulation, was largely shaped by the need to provide data comparable to that collected in the aforementioned studies at Longbenton and Llanishen.

Other work in the Institute on the prediction of demand for car-sharing (Bonsall, 1980) and the establishment of experimental car-sharing schemes (Bonsall et al, 1980) provided a useful basis for comparing the survey requirements for identifying potential car-sharers with those for identifying existing ones.

1.2 Objectives

Thus the main objective of the study is to obtain specific information on the proportion and characteristics of existing car-sharers /poolers at a large office complex where flexible work hours are operated, located in a city centre where car parking provision is severely restricted. Subsidiary objectives are: to compare data collection methods, as between questionnaire and interview; provide views on the

relative importance of the various data items collected by the above two methods; and to provide recommendations for future research workers carrying out similar surveys at other locations.

1.3 Framework of the report

Chapter 2 gives a description of the study area, including the reasons for choosing Sheffield and the survey sites. It then gives a description of the prevailing traffic, parking and public transport conditions in the area.

Chapter 3 reports on the surveys themselves, including data collection methodology, questionnaire design, survey organisation, survey distribution and collection, and the problems encountered in the surveys. A separate section covering interview methodology and the advantages and disadvantages of interviews over questionnaires is included.

Chapter 4 deals with the data processing, covering coding, punching and validating.

Chapter 5 covers the analysis of the data in terms of tabulations and comments thereon.

Chapter 6 discusses the implications of the study findings for car-sharing/pooling, for peak spreading, and for the techniques used for investigation.

Chapter 7 concludes the main body of the report by drawing together the analysis and more important findings, and summarises our conclusions and recommendations for workers surveying a potential site.

Copies of questionnaires, interview forms and relevant correspondence are included in the Appendices.

2. DESCRIPTION OF STUDY AREA AND SITES

2.1 Choice of city

The reasons why Sheffield was chosen as the location for this study were as follows:

i) it has a well defined central business area, with restricted car parking facilities;

ii) it contains several large public and private sector office blocks which were potential targets for the study;

iii) a high proportion of the office employees in the city are on flexible work hours;

iv) the city is within easy reach of the study base at Leeds;

v) South Yorkshire County Council have been studying peak spreading in the city.

2.2 Prevailing traffic conditions in Sheffield

The city of Sheffield is well known as an important manufacturing centre, particularly for steel products. Most of the manufacturing industry is located along the valley of the river Don, running from Sheffield city centre north-eastwards to Rotherham. The city centre itself occupies a compact site on a hill overlooking the river, and has developed through the post-war years into a thriving centre of commercial retail activity, employing about 71,000 persons, of whom approximately 55,000 travel to work in the peak hour (8-9 a.m.). (SYCC 1979a).

There are few schools in the centre, but there are 3500 full-time students at the Polytechnic in Pond Street, and 200 students in the Applied Science Departments of Sheffield University, both on the edges of the city centre. (SYCC 1979a).

2.3 Transport facilities

All parts of the city are accessible by bus from the city centre, and additionally there is a frequent free bus service connecting the bus and rail termini to the main office and shopping areas. The County Council operates a low fares policy which results in public transport in Sheffield being the cheapest in the U.K. (typically 10p for about 5 miles.) In addition, Council policy is to limit the number of long-stay car parking spaces in the central area, as a form of restraint.

Some idea of the effectiveness of these policies may be gained from the modal split of the journey to work. From cordon surveys by SYCC in 1977/78 for the journey to work in the central area, from 8-9 a.m., the split was approximately 40% by car, and 60% by bus (out of a total of approx. 42,000 trips in that hour). In early 1979 bus services were curtailed by a gritters' strike lasting a few weeks. In our interviews, as described in the following chapter, we found no evidence of this leading to permanent passenger loss.

2.4 Parking

Fig. 2.1 shows the locations of central area car parking, and tables 2.1 and 2.2 show the capacity and peak occupancy of each location. Most of the public central area parking is intended for shoppers, and the pricing structure reflects this. Prices for all-day parking range from 37p on the periphery (Blonk St., Eyre St., Victoria Station) to £1.35 in the centre (Cole Bros.).

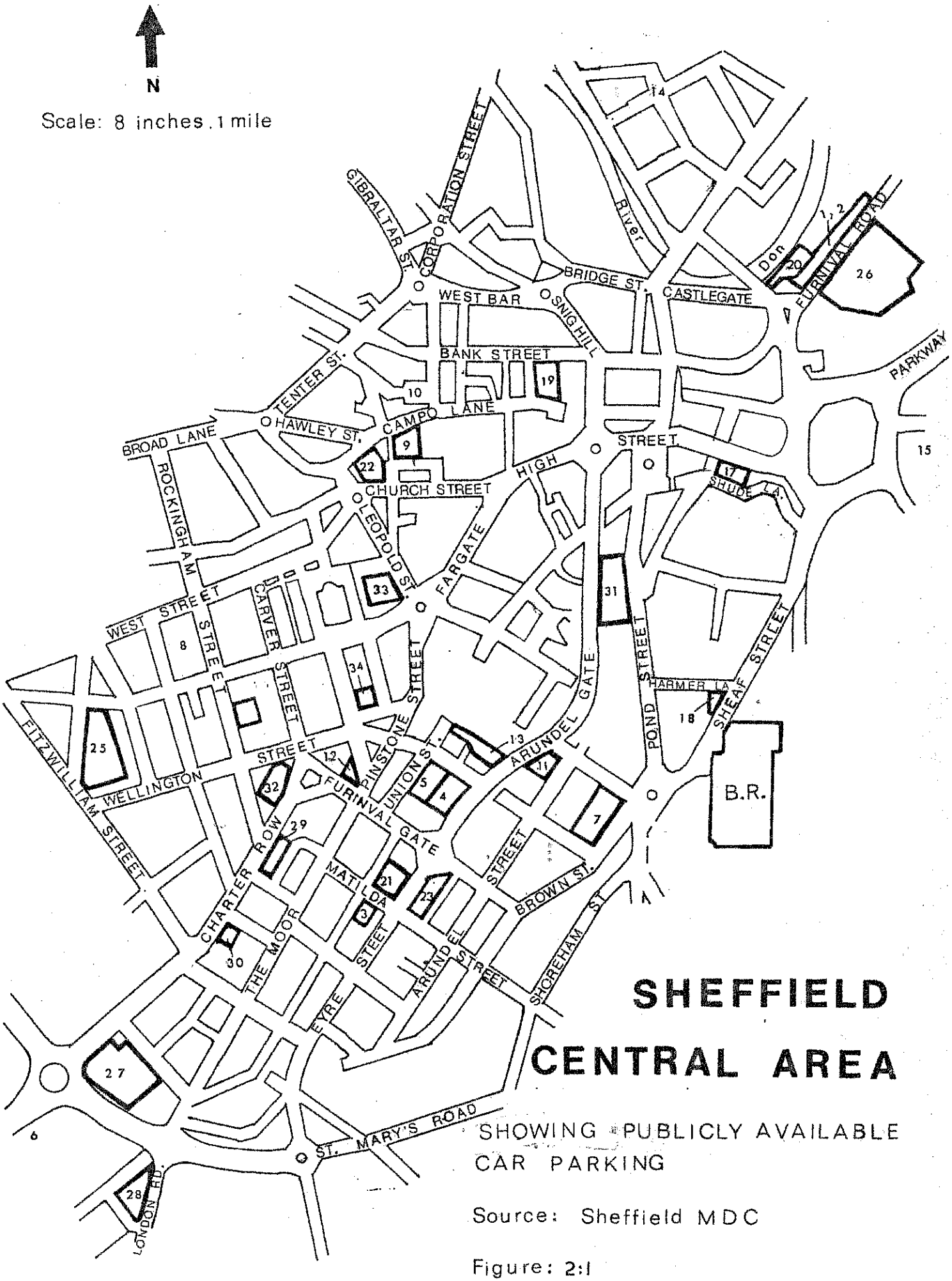
From tables 2.1 and 2.2 it can be seen that the peak occupancy of public car parks in the central area varies greatly from one location to another. Average peak occupancy in the whole central area is approx. 71% for public car parks, 81% for on-street parking, and 75% for PNR (SYCC 1979b).

2.5 Congestion

Data on average speeds, flows, parked vehicles per km and stopped time are given for Sheffield in Table 2.3 with, for comparison, the same data for thirteen towns surveyed in a study of congestion carried out by the Department of Transport in 1967 and 1976 (TAU, 1978). From this it can be seen that for the central area of Sheffield in 1976, speeds in the peak hour were about the same as the average for the thirteen towns, although stopped time as a percentage of journey time was somewhat greater. In the off-peak, Sheffield speeds were greater than average, again despite a higher stopped time ratio. It will be noticed that peak hour speeds in Sheffield have risen faster since 1967 than average, despite a faster increase in flows. This is perhaps due in part to the larger than average reduction achieved in kerbside parking.

2.6 Choice of office sites

The two survey sites were chosen from a number of possibilities identified in the early stages of the project. Originally, 12 firms from the private sector were identified as possible targets, together with 5 Government Departments, 4 hospitals, 1 hotel, 2 colleges of further education, the head post office and 9 other public sector employers. The criteria for final selection of the targets were that the selected locations needed to contain predominantly clerical employment with little company car use, situated in the central area.



SHEFFIELD CENTRAL AREA

SHOWING PUBLICLY AVAILABLE CAR PARKING

Source: Sheffield MDC

Figure: 2:1

Table 2.1 Capacity and Usage of Central Area Car Parks (Public off-street)

Ref. No.	Location	Capacity	Max. occupancy in morning
1	Victoria Station (Police)	100	90
2	Victoria Station (B.R.)	c 100	105
3	Matilda Street	c 45	40
4	Union Lane	c 74	70
5	Union Street	107	100
6	Davy Computing, Ecclesall Rd.	24	23
7	Polytechnic	190	180
8	Post Office, Wellington St.	115	115
9	St. Peter's House, Campo Lane	60	60
10	Paradise Square	c 60	60
11	Co-operative	c 70	65
12	Grosvenor House Hotel	80	60
13	Town Hall	c 135	125
14	Johnson St.	c 110	110
15	Broad St.	200	170
16	Rockingham St.	114	100
17	Shude Lane	85	85
18	Harmer Lane	100	95
19	Hartshead/Bank St.	510	470
20	Blonk St.	323	270
21	Furnival Street	330	270
22	Campo Lane	180	90
23	Eyre St.	150	135
24	Sheaf House	128	100
25	Devonshire St.	280	175
26	Park Goods Station, Furnival Rd.	540	200
27	Moorfoot	200	105
28	Boston St.	80	50
29	Roberts Store	260	90
30	Sainsbury's	440	115
31	Pond St./Arundel Gate	625	390
32	Wellington St./Charter Sq.	460	335
33	Fountain Precinct	90	30
34	Cole Bros.	236	225
	Total	6611	4703

Source: (SYCC 1979b)

Table 2.2 Capacity and Usage of Central Area Car Parks (On-street and private off-street) Source: S.Y.C.C. 1979b

Type	Capacity	Max. occupancy (end morning p.k.)
On-street	845	684
Private off-street (PNR)	3472	2620

Table 2.3 Comparison of Congestion Parameters for Central Areas of Sheffield and 13 other towns

Peak hour	1967		1976	
Parameter	Sheffield	Average*	Sheffield	Average*
Av. speed km/hr	11.1	16.9	21.9	20.6
Av. flow pcu/hr	1510	1565	2260	1736
Parked vehs/km	31.4	20.4	2.7	7.6
Ratio of stopped time: journey time	-	-	41.6	33.1

Off-peak	1967		1976	
Parameter	Sheffield	Average*	Sheffield	Average*
Av. speed km/hr	16.6	18.8	28.3	23.6
Av. flow pcu/hr	1325	1316	1795	1382
Parked vehs/km	72.4	35.5	8.4	14.7
Ratio of stopped time: journey time	-	-	30.2	24.6

* Figures under 'average' refer to the central areas of 13 towns/cities surveyed by the Department of Transport (TAU, 1978) viz; Birmingham, Liverpool, Manchester, Leeds, Newcastle, Sheffield, Bristol, Leicester, Luton, Reading, Preston, Watford, Chesterfield.

A single office complex containing atleast 1000 employees was the client's preferred option, but up to 3 separate employers with a total aggregate staff amounting to this same figure was deemed acceptable. The employers should, as far as possible, have been confined to the public sector or to those firms offering comparable conditions to the public sector.

A gradual whittling down of the potential targets took place on the basis of these criteria, and a shortlist was produced (Table 2.4). The final selection depended mainly upon management co-operation from the organisations approached.

Table 2.4 Shortlist of Possible Survey Targets

Organisation	No. of employees	No. on flexible work hours
Midland Bank Headquarters	1500	1500
Midland Bank International Div.	360	360
Yorkshire Water Authority	200	200
National Coal Board Pensions Office	380	380
South Yorkshire County Council Police	250	0
Sheffield Polytechnic	250	0
Sheffield University Applied Science Dept.	270	0
Sheffield Metropolitan District Council	1750	1300
Sheffield Education Office	290	250

Those finally selected were Midland Bank H.Q. and N.C.B. Pensions. It was initially hoped to involve Sheffield M.D.C., but after three weeks' negotiation they withdrew, expressing concern over the size and timing of the survey. It appeared too, that dissatisfaction with their flexible work hours system might have prompted their refusal.

3. REPORT OF SURVEYS

3.1

This chapter summarises the methodology and organisation of both questionnaire and interview surveys as previously reported in a separate document. (Report of Surveys, TN 39)

3.2

The first survey was carried out on Wednesday 27th February 1980 at the National Coal Board Pensions Offices at St. James' House, Vicar Lane and Northchurch House, Queen Street, both in the postal district of Sheffield S.1.

The second survey was carried out on Wednesday 19th March 1980 at the Headquarters of the Midland Bank Ltd., at Griffin House, Silver Street Head, also in the postal district of Sheffield S.1. Figure 3.1 shows the location of each site.

The timing of the surveys was important in that general holiday periods had to be avoided, as did vacations of Sheffield University and Polytechnic, as traffic conditions in Sheffield alter in these periods.

3.3 Data collection methodology

The questionnaire distributed at N.C.B. (Appendix C) was designed to indicate current levels of car sharing, but not to pursue the characteristics of the sharers to any great depth. To obtain this more in-depth information, the questionnaire provided a base for follow-up interviews which probed respondents' decisions in greater detail, as described below in this chapter. The Midland Bank questionnaire (Appendix F) was almost twice the length of the N.C.B. questionnaire, and was designed to fulfil the purpose of both the shorter form plus the interviews. In this way a comparison between the two methods of data collection would be available, in terms of efficiency, reliability of response and cost.

3.4 N.C.B. survey

3.4.1 Office characteristics

The characteristics of the office worthy of note are:

i) The majority of the employees are engaged in clerical/administrative work.

ii) All employees are on flexible work hours.

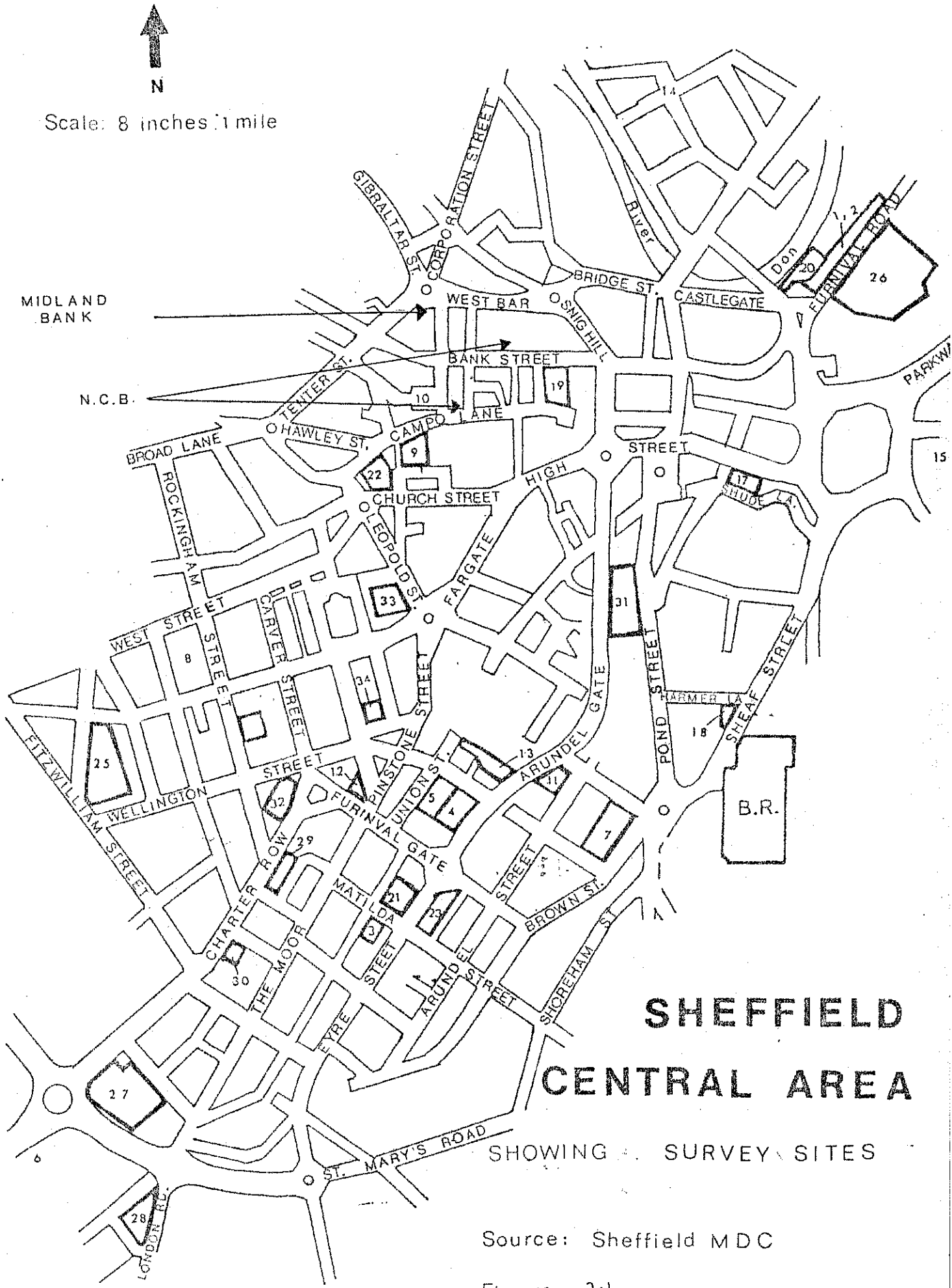
iii) The offices are located in the city centre.

iv) There are limited parking facilities around the office.

v) The office provided 15 car parking spaces on site. These are reserved for essential car users only.

vi) The majority of the employees (≈80%) are female.

vii) The number of employees at work on the day of the survey was 380, all of whom were given questionnaires.



SHEFFIELD CENTRAL AREA

SHOWING SURVEY SITES

Source: Sheffield MDC

Figure: 3:1

3.4.2 Survey organisation

After the initial approach had been made to the management to obtain permission to conduct the survey, a series of meetings was arranged culminating in a final meeting between ourselves, the management and representatives of the trade unions involved. Certain objections to specific questions in the questionnaire were raised, as a result of which slight changes to question wording and format were made to the final copy of the questionnaire. The majority of the problems were concerned with the personal information requested in the final section of the form, and with our asking for the respondent's home address. After due consideration it was decided to drop one of the personal questions (asking for the respondent's name), and to ask for post-code only of the respondent's home address. Sheffield had recently had a large amount of publicity concerning the use of postcodes, and the great majority of respondents knew their postcode. (See 4.2)

Because of the time which had to be allowed for negotiations within N.C.B., the time lapse from initial contact to survey was 12 weeks. Most of the questionnaire negotiations took place in the final month before the survey.

3.4.3 Survey groundwork

Before carrying out the survey, it was thought necessary to circulate explanatory letters around the various departments in the office (Appendix A). This basically served the function of informing the staff what we were doing and when we would be coming. It also tended to save having to make repetitious lengthy explanations on the day of the survey.

On the survey day itself, each form was accompanied by a further covering letter fulfilling the same function. (Appendix B).

Thus, at the actual survey time, all the respondents were aware of the purpose of the survey and of the fact that both unions and management had given their agreement.

3.4.4 Distribution and collection

One of the main concerns on our part was to ensure that all the questionnaires were completed for the same day. A major concern of both ourselves and N.C.B. was to preserve confidentiality of response, i.e. to reassure the respondents that their responses would only be seen by members of the Institute. The method of distribution and collection of

the forms provided a satisfactory answer to both these concerns.

It was decided that the forms would be distributed and collected by members of the Institute, with union representatives in attendance. In this way, the forms were put on the desk of the respondent, and picked up from there 20 minutes later. The presence of the union official tended to reassure the respondent that there were no confidentiality problems, and the sight of 'unknown faces' actually collecting the completed forms reinforced this view. An added bonus came from this procedure in that the union officials seemed to know all the respondents, and this probably boosted the response rate (a 95% response rate, i.e. 357 returns, was obtained). It is thought also that a 'personal' distribution/collection method such as this tends to reduce the refusal rate anyway as the respondents are less likely to argue the validity of the survey face-to-face with the surveyors.

3.5 Midland Bank survey

3.5.1 Office characteristics

The characteristics of the office worthy of note are:

i) The majority of the employees are engaged in clerical/administrative work.

ii) The majority of employees are on flexible work hours.

iii) The office is located in the city centre.

iv) There are limited parking facilities around the office.

v) The office provides 396 reserved parking spaces in a car park under the building. Spaces are reserved on the basis of seniority.

vi) The office had moved 'en masse' from London to Sheffield 4 years previously in January 1976.

vii) There were approximately 1500 employees at work on survey day; 500 were circulated with questionnaires.

3.5.2 Survey organisation

The initial approach to the Head of Administration to obtain permission to conduct the survey produced no further meetings. The questionnaire was discussed and approved at this intitial contact stage, and no meetings were required to examine the construction or content of the form. No request was made by him for us to obtain union approval, but we felt it would be prudent to do so. In fact, no changes were requested by the unions either, so the questionnaire was circulated in its original form (Appendix F). The time lapse from initial contact to survey was 5 weeks, with little actual negotiation taking place.

3.5.3 Survey groundwork

Similarly to the N.C.B. Survey, advance notice letters were circulated around the various departments in the office (Appendix D), and further covering letters accompanied each individual form on the survey day, (Appendix E).

3.5.4 Distribution and collection

Our original intention was to adopt the same procedure as that used at N.C.B., but this was not allowed by the Bank for security reasons. Eventually, after much consideration, it was decided to circulate the forms via the internal mail system to a sample of the employees (500 out of 1500) preselected at random from the Bank's internal telephone directory. The use of the internal telephone directory gave some problems because it proved to be slightly out of date, and some forms were circulated to employees who had either left the Bank or moved to different offices. The exact number of forms that went astray is unknown due to a lack of feedback from the various departments. Information on returns is included in Table 3.1.

The collection method was to have collecting boxes by the exit for respondents to put their completed forms in. Unfortunately, we could not guarantee that all the forms were completed for the same day, although we did cut down this possibility by emptying the collecting boxes at the end of the distribution day. Thus we could be sure that at least the forms collected then were completed on the same day. The remainder of the forms, i.e. those completed on subsequent days, were collected 5 days later, and marked as such. (This number amounted to 35 out of 272 responses - 12.7%).

The technique of selecting employees at random within a department was intended to ensure that the sample receiving questionnaires was representative of the whole department. However, because of the aforementioned problems encountered in the distribution system, complete freedom from bias cannot be assured.

3.6 Questionnaire design

3.6.1 The basic questionnaire

Two questionnaires were designed for use in this study. The basic questionnaire (Appendix C) circulated at N.C.B., consisted of 4 sides of A4 paper, and covered the following areas:

Table 3.1 Returns from Midland Bank

Dept.	No. distributed	No. persons missing*	Number returned completed 1st day/after 1st day	No. returned uncompleted
1	6	3	3	3
2	6	Unknown	5	-
3	27	5	14	5
4	5	Unknown	1	-
5	17	2	15	1
6	6	Unknown	6	-
7	77	Unknown	38 + 2	-
8	15	5	9 + 1	-
9	26	8	10 + 1	-
10	46	8	39	6
11	269	Unknown	97 + 31	-
Total	500	-	237 + 35	15

* For whom forms were occasionally completed by others.

i) The journey to work.
ii) Work hour arrangements.
iii) Attitudes to public transport.
iv) Household constraints on travel.
v) Personal information.

Appendix C also includes notes on the reasons for including individual questions.

3.6.2 The extended questionnaire

The extended questionnaire (Appendix F) circulated at Midland Bank, was an expanded version of the basic questionnaire and consisted of 7 sides of A4 paper, covering the following areas:

i) The journey to work.
ii) Car pooling/sharing - details of existing arrangements.
iii) Work hour arrangements.
iv) Attitudes to public transport.
v) Household constraints on travel.
vi) Personal information.

As can be seen, the inclusion of a section on car pooling/sharing in the extended version is the main difference between the two. The basic questionnaire contained questions on whether the respondent travelled alone, shared, or by public transport, and also on the number of people in the car. The extended questionnaire questions were more oriented towards details of schemes. The reason for this relates back to the objectives of the study in that information on car pooling/sharing was to be sought by interview at N.C.B., the basic questionnaire providing the means of identifying potential interviewees. A comparison between the two means of data collection, i.e. interview and questionnaire, was then to be made, whilst at the same time, bringing the data provided by the selected interviewees up to the standard of that collected by the extended questionnaire.

Apart from including a section on car pooling/sharing, the extended questionnaire also included some extra questions in other sections. The reasons for this were i) to correct any faults which had emerged when the results of the basic questionnaire had been looked at, and ii) to obtain further details about specific issues. For example, questions 1D(4) and 1F were included to try to establish some measure of cost of alternative modes, and question 1G (1F in the basic questionnaire) was re-styled in layout to provide more room for answers.

Appendix F also includes notes on the reasons for inclusion of individual questions.

3.6.3 The follow-up interview

The follow-up interview forms were designed on the basis of the differences between the two questionnaires, i.e. the questions on the interview form comprised mainly those questions which were not included in the basic questionnaire, but included in the extended questionnaire. The technique employed in the interviews was, firstly, to ask the questions on the form, and then to follow up in greater detail every point of interest which had emerged. Due to the semi-structured form of the interviews, it was considered more appropriate to have separate lists of questions for each type of travel (drive alone, car passenger with kin etc.), rather than to have one master list with a series of filter questions. (See Appendix G for the interview question lists.)

3.7 Follow-up interviews

3.7.1 Methodology

The interviews were carried out among N.C.B. staff, for whom we already had a good deal of information from the basic questionnaire. The purpose of the interviews was:

1) To obtain the extra information gathered in the extended questionnaire, over and above the basic version.
2) To obtain further in-depth information on the reasons behind the transport decisions made by interviewees.

The former purpose was achieved by going through the questions as shown on the interview sheet; however questions to cover the latter purpose could not be framed sensibly to cover every eventuality, and consequently, the technique used was simply to probe a little more deeply into what seemed to be interesting areas. For example, some car-sharing arrangements were found to be much more complicated than would appear from the questionnaire, and the details of these were sought (see 'Results' section).

The interview day was 4th June 1980, 14 weeks after the questionnaire survey, and although the management at N.C.B. were always very helpful and co-operative, it was clear that any further visits would not have been welcome. It is important therefore to bear in mind that, even if a combination of questionnaires followed by interviews seems the cheapest or most efficient method to adopt, opposition from the firm concerned to repeated calls may prove a major stumbling block.

Forty-nine persons were selected for interview from a total of 109 who had previously agreed to take part by giving their name on the questionnaire. The selection was made randomly within traveller type (bus passenger, solo driver etc.).

The list of names was submitted to the personnel department at N.C.B. who split them into three groups, one for each interviewer, arranged into ten-minute time slots. Inevitably some of those selected were absent on the survey day (seven in all), however at the end of the day 42 interviews were obtained, with at least one in each traveller type.

4. DATA PROCESSING

4.1

Having collected the data as described in the previous chapter, the next task was to process it into a form suitable for running computer tabulations. The main elements involved in this task were coding, punching, validating and tabulating, and are described below.

4.2 Coding

In order that the answers to the questionnaires could be handled by computer, it was necessary to transform each answer into a numerical code. A coding manual was produced for each of the two questionnaire types, detailing the codes allotted to each possible answer. In addition to codes for positive answers, questions which did not apply to the particular respondent were given a special code, as also were questions which were not (but should have been) answered.

The idea of incorporating space for coding on the questionnaire form itself was considered at an early stage, but rejected for several reasons:

1) It would make an already long questionnaire even longer and more complicated.
2) The sight of 'official' areas for computer coding of answers might have deterred some respondents.
3) It would have been difficult to work from lengthy 4 or 7 page forms at a card punch.

Most of the coding involved a straightforward, if tedious, process of looking up the relevant code for each answer and entering it on the coding form. However, two elements in particular required somewhat greater effort. Firstly, the times of starting and finishing work had, in many cases, to be converted from hours and minutes into decimal hours. (The work time card-punching equipment at both sites operated in decimal hours, and most respondents referred to their time cards directly to provide the required information. However, others stuck to hours and minutes, which had then to be converted).

The second item was the coding of home address. In order to help preserve confidentiality, it had been agreed at an early stage to ask simply for the postcode (or the full address if this was not known). In fact over 90% of respondents gave their full postcode. At the coding stage these were simply transcribed, and the postcodes obtained for those few cases where addresses had been given. It was, however,

necessary at a later stage to convert the postcodes into traffic zones for analysis. Unfortunately, this process turned out to be less simple than might have been expected, principally because there was no map available showing the post code boundaries. (Note also that postcode directories are useful only for obtaining postcodes from addresses, not vice versa.) The method adopted was a two-stage process whereby firstly the Ordnance Survey Grid Reference (OSGR) of each postcode was obtained from the Sheffield section of the RHTM data bank postcode/OSGR file.* Secondly, the OSGR was located on a zone map, and the relevant zone number coded. The zoning system used was an amalgamation of the Sheffield/Rotherham Land-Use Transportation Study zoning system.

The coding was carried out mainly by temporary staff employed for the purpose and trained in-house.

4.3 Punching

Having coded the information, two methods were considered for transferring it ot the computer file. The first was key-to-disk, whereby the operator punches the coded information directly to a computer diskfile via a visual display unit. The second was the use of cards, whereby the information is punched onto computer cards, which are later fed into computer storage via a cardreader. The advantages of key-to-disk are that it is easier to correct mistakes as they occur, and hence the process is slightly faster; and there is no need to handle and store bulky boxes of cards. The advantages of cards are that they provide an extra back-up should the file be corrupted; and the system of punching and verifying, as described below, provides an extra check on operator errors. However the main factor in our decision to use punched cards was that, although there were no facilities in the University for keying (or punching) large amounts of data, there were several outside firms available to carry out the punching.

Where large amounts of data are being punched, especially where direct supervision is not possible, it is always advisable to have the cards verified after punching. This process involves putting the already-punched cards into a second keyboard machine on which the operator types the same data from the coding sheets as is contained on the cards. Any discrepancies between what is being typed and what is

... ...

* The assistance of the Data Bank Administrator, Dept. of Transport, St. Christopher House, Southwark Street, London SE1 is acknowledged.

already punched is sensed by the machine and a warning given. In this way purely punching errors (as distinct from coding or other errors) are greatly reduced.

4.4 Validating

Once the punched cards have been read in and stored on the computer, it is necessary to validate the data. By this is meant the process of checking the data to make sure that each item occupies its correct position, that it falls within specified allowable ranges, and that related items of data are compatible.

Errors can enter the data in four main ways, including:

1) Wrong, inadequate or inconsistent answers given by the respondent - these may be due to bad phrasing of the question.
2) Coding errors - including wrong codes and codes placed in wrong columns.
3) Punching errors - including misinterpretation of the coder's writing.
4) Reading errors on transfer to disk file - rare but not impossible.

The purpose of validating is therefore to put the data through a series of close checks in an attempt to weed out as many errors as possible. With small amounts of data it may be possible to do this manually by scrutinising a listing of the data file, but with larger amounts it is advisable, and more thorough, to use a data-checking computer program. In this case it was initially planned to convert an existing program obtained from an outside source. However, due to the heavy involvement of the computer staff in the installation and testing phase of the University's new Amdahl computer, it proved impossible to de-bug this program in the time available. Consequently a program was written specifically for the project and this was successfully tested and applied to the data set.

The output of the program includes a listing of each record which contains an error, together with information on which field is in error and why. Once the reason for each mistake had been found, the errors were corrected by editing the data file at a VDU, using the interactive editing facility.

4.5 Tabulating

Tabulations were carried out using version 8 of the SPSS (Nie et al, 1975) package on the University's Amdahl VM 470 computer. Under this system, the first run specifies the format of the data, together with the names of each variable and the meaning of the value of each variable. (For example, it may be specified that the variable JTOW1 is contained in columns 20/21 of card 1, that it represents the mode of the first stage of the journey to work, and that a value of 1 means car, 2 means bus, etc.). This first run produces what is known as an SPSS system file, so that in subsequent runs, tabulations are produced simply by naming the relevant variables, without needing to refer to the format, value labels etc.*

One advantage of running tabulations on the Amdahl computer is that, because turn-round is so fast (a few seconds normally), the output can be inspected at the VDU immediately after the run is executed. Only successful runs need then be printed.

4.6 Storage

The coded data from both questionnaires will be stored on unvalidated punched cards for a limited period in the Institute for Transport Studies. The validated data is currently held on disk on the University's Amdahl VM 470 computer, and copies are being made on magnetic tape.

The interview forms, with serial numbers for cross reference to relevant questionnaire data, but with names removed to preserve confidentiality, are being stored in the Institute.

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* A full description of the system files, and instructions for running any further tabulations, is given in a separate Technical Note.

5. RESULTS

5.1 Characteristics of Respondents

5.1.1. Personal Characteristics

Table 5.1 indicates several marked differences between survey sites, notably:-

i) NCB employees are predominantly female, males are in a small majority at MB.

ii) NCB employs larger proportions of younger (under 21) and older (over 50) staff.

iii) Virtually all NCB employees earn under £5000 p.a. and most between £2500 and £5000; MB salaries are fairly uniformly distributed between the £2500-£5000, £5000-£7500 and over £7500 categories

5.1.2. Use of a car

Table 5.2 indicates that while over 80% of MB employees have cars available for their use, under 60% of NCB employees do. Of these:

i) few have company cars although the proportion doing so is double at MB.

ii) 40-50% use their cars 5 days a week to travel to work.

iii) Over 30% at NCB, but under 20% at MB are likely to have their cars used for a work journey by anonther person if left at home.

iv) One third of both groups have more than one car in the household.

Car availability differences between sites are not explained solely by differences in sex and salary distribution. Females at MB, particularly, appear to have higher levels of car availability for any given salary level.

5.1.3. Main mode to and from work

Table 5.3 presents the main modes to and from work at both sites, for single mode trips, the main mode of mixed mode trips, and the sum of these. It indicates

i) that car and bus predominate, while walk, train and other are generally insignificant.

ii) That, not surprisingly, bus represents a larger proportion than car of mixed mode trips.

iii) That journeys to and from work are similar, although there is some evidence of a switch from car to bus at NCB and from bus to car at MB for the journey home.

Since the information by five modes, by single and mixed modes and by journey to and from work serves to complicate the tables, full information

Table 5.1 Personal characteristics of respondents

	N.C.B.			M.B.		
	No.	% of respondents	% of answers	No.	% of respondents	% of answers
Total respondents	357	100.0		272	100.0	
Sex						
Male	68		19.9	162		59.6
Female	274		80.1	110		40.4
Total	342	95.8	100.0	272	100.0	100.0
Not answered	15	4.2		0	0	
Age						
Under 21	78		22.2	28		10.3
21 - 30	134		38.1	115		42.4
31 - 50	95		27.0	109		40.2
Over 50	45		12.8	19		7.0
Total	352	98.6	100.0	271	99.6	100.0
Not answered	5	1.4	1		0.4	
Salary p.a.						
Under £2500	43		14.5	12		4.9
£2501 - £5000	229		77.1	90		36.4
£5001 - £7500	17		5.7	63		25.5
Over £7500	8		2.7	82		33.2
Total	297	83.2	100.0	247	90.8	100.0
Not answered	60	16.8		25	9.2	
With telephone	290		82.9	242		89.6
Without telephone	60		17.1	28		10.4
Total	350	98.0	100.0	270	99.3	100.0
Not answered	7	2.0		2	0.7	

Table 5.2 Respondents with a car available for their use

Car available for use	N.C.B. No.	N.C.B. % of answers	M.B. No.	M.B. % of answers
Male				
< £2500	1	25	N/A	
£2500 - £5000	25	76	11	52
£5000 - £7500	8	100	35	85
> £7500	4	100	74	96
Female				
< £2500	11	44	4	80
£2500 - £5000	67	51	28	61
£5000 - £7500	4	57	17	89
> £7500	1	50	2	100
Total having car avail.	148	58.3	185	80.8
No car available	106	41.7	44	19.2
Total answering question	254	100.0	229	100.0
Not answering	103		43	
	No.	% of respondents with a car available	No.	% of respondents with a car available
Company car				
Yes	10	6.8	25	13.5
Company contribution to car upkeep (Not company car)				
Yes	0	0.0	2	1.1
No. of days per week car used for journey to work				
0	49	33.1	45	24.3
1	8	5.4	10	5.4
2	7	4.7	9	4.9
3	1	0.7	2	1.1
4	1	0.7	4	2.2
5	58	39.2	88	47.6
6	1	0.7	1	5.4
Varies	8	5.4	22	11.9
Will another person use the car if left at home?				
Yes	48	32.4	36	19.5
Another car in household				
Yes	51	34.5	61	33.0

Table 5.3 Main mode of transport to/from work at NCB and MB

Single mode trips	Car	Walk	Bus	Train	Other	Total
N.C.B. to/from	92/78	2/1	151/159	1/1	0/1	246/240
M.B. to/from	122/132	2/1	82/73	0/0	0/1	206/207

Main mode of Mixed mode trips	Car	Walk	Bus	Train	Other	Total
N.C.B. to/from	17/13	2/2	64/61	14/11	0/0	97/87
M.B. to/from	17/12	0/0	28/33	7/5	0/0	52/50

Main mode of all trips	Car	Walk	Bus	Train	Other	Total	Not answered
N.C.B. to/from	109/91	4/3	215/220	15/12	0/1	343/327	14/30
M.B. to/from	139/144	2/1	110/106	7/5	0/1	258/257	14/15

is provided in tables in Appendix H and the following tables in this section consider only main mode trips to work by car and bus.

Table 5.4 indicates the percentages of trips to work by car and bus at the two sites. It is clear that while car predominates at MB, bus does at NCB.

5.1.4. Main mode by sex

Table 5.5 (from Table H.1) indicates that at both sites males are roughly 1.5 times as likely as females to use cars. Conversely (Table H.1) females are more likely to make mixed mode trips and to have a different journey home.

5.1.5. Main mode by sex and salary

Table 5.6 (from Table H.2) indicates as expected that car use increases with income; the effect is more marked at NCB and for females, although

numbers in the higher income groups are small. Those in the lower income groups at N.C.B. are less likely than those at M.B. to use cars.

Table 5.4 Percentage of main mode trips to work by car and bus at N.C.B. and M.B.

	Car	Bus	Other
N.C.B.	31.8	62.7	5.5
M.B.	53.9	42.6	3.5

Table 5.5 Percentage of main mode trips to work by car and bus at N.C.B. and M.B. : male and female

		Car	Bus	Other
N.C.B.	Male	39.4	48.5	12.1
	Female	29.6	66.6	3.8
M.B.	Male	61.4	32.9	5.7
	Female	42.0	58.0	0.0

Table 5.6 Percentage of main mode trips to work by car and bus at N.C.B. and M.B. : by sex and salary

	Car	Bus	Other
(a) N.C.B.			
All respondents			
< £2500	20.0	70.0	10.0
£2500 - £5000	28.9	64.5	6.6
£5000 - £7500	58.9	41.1	0.0
> £7500	85.7	14.3	0.0
Male			
< £2500	40.0	40.0	20.0
£2500 - £5000	26.3	57.9	15.8
£5000 - £7500	62.5	37.5	0.0
> £7500	75.0	25.0	0.0
Female			
< £2500	17.6	73.5	8.9
£2500 - £5000	28.7	67.4	3.9
£5000 - £7500	62.5	37.5	0.0
> £7500	100.0	0.0	0.0
(b) M.B.			
All respondents			
< £2500	30.0	70.0	0.0
£2500 - £5000	45.9	54.1	0.0
£5000 - £7500	44.3	50.8	4.9
> £7500	75.0	18.7	6.3
Male			
< £2500	N/A	N/A	N/A
£2500 - £5000	50.0	50.0	0.0
£5000 - £7500	39.0	53.7	7.3
> £7500	75.6	17.9	6.5
Female			
< £2500	30.0	70.0	0.0
£2500 - £5000	44.1	55.9	0.0
£5000 - £7500	55.0	45.0	0.0
> £7500	50.0	50.0	0.0

5.1.6. Possession of full driving licence

The main points emerging from Table 5.7 are that the overall split between possession and non-possession of full driving licence differs greatly between the two sites. A small majority of NCB respondents do not possess driving licences, while at Midland Bank more than three-quarters of the respondents stated that they possessed full licences. Only slightly over one third of NCB females possess full driving licences, while almost two-thirds do at MB. Differences in possession of a driving licence are not explained solely by differences in sex and salary distribution. In particular, female employees at NCB are less likely than those at MB in any salary range to possess a full driving licence.

Table 5.8 (from Table H.3) shows that the majority of licence holders at both sites travel by car. One surprising point (Table H.3) is that more NCB licence holders travel home by bus than travel home by car.

The majority of non-licence holders travel by bus at both sites, although MB has a higher proportion of non-licence holders travelling by car than NCB.

Licence holders at NCB are slightly less likely to use a car than at MB; non-holders at NCB are half as likely to do so.

5.1.7 Origin zone

Table 5.9 shows mode against origin zone of respondents for journey to work. The zones were created from an aggregation of SRLUTS zones (see Section 4.2) into compass bearing zones, (see Fig. 5.1 and 5.2 for areas covered).

Table 5.9 shows that car use is more important in the external zones than the internal zones for both sites, as is train, whilst bus tends to predominate in the internal zones.

Table 5.9 also shows the distribution of respondents within zones for both sites, and from this it can be seen that MB has a higher proportion of respondents in the external zones than NCB. In the internal zones a higher proportion of MB respondents originate from the South-West and West than NCB whose respondents tend to originate from the northern and eastern areas.

Table 5.7 Constraints on travel; Percentage of respondents possessing a full driving licence - by sex

	NCB			MB		
	Male	Female	All respondents	Male	Female	All respondents
Full Driving Licence	72.4	39.3	46.5	87.6	63.6	77.8
No Full Driving Licence	27.6	60.7	53.5	12.4	36.4	22.2
Total %	100.0	100.0	100.0	100.0	100.0	100.0
Total Number	58	211	269	145	99	244
Not Answered			88			28
Full Driving Licence by salary range						
< £2500	33	25		N/A	58	
£2500 - £5000	64	40		60	59	
£5000 - £7500	100	50		85	85	
>£7500	100	100		96	100	

Table 5.8 Percentage of main mode trips to work by car and bus at N.C.B. and M.B.: licence holders and non-licence holders

		Car	Bus	Other
NCB	Full licence	51.6	44.4	4.0
	No licence	16.9	76.8	6.3
MB	Full licence	60.3	36.4	3.3
	No licence	31.3	64.6	4.1

5.1.8. Trip length

Table 5.10 shows no great differences in standard deviation of respondents' estimated trip lengths to work. The longer mean trip length in the north east zone is probably due to NCB employees from Rotherham. External NCB trips appear to have a greater spread of trip lengths.

Table 5.11 shows similar information by mode, indicating that mixed mode journeys are usually longer, and that greatest journey lengths are found for travel by train, followed by car, then bus, then walk.

5.1.9. Respondents' household type

Table 5.12 shows this data. The household categories were devised on the basis of the combinations of age groups within the household. The age limits are shown in Table 5.12. The majority of respondents at both survey sites fall into one of two categories: self plus adult(s), and self plus child(ren) plus adult(s). These can be roughly interpreted as couples without school age children and couples with school age children respectively.

Midland Bank has a relatively high proportion of employees who live alone - 9.2% of all households compared to 3.2% at NCB.

5.1.10. Main mode to work by household type

Table 5.13 (from Table H.4) indicates no obvious patterns of mode choice for the two major household groups. Table H.4 indicates that the 'living alone' category are particularly likely to use buses.

Table 5.9 Main mode of transport to work by zone

	NCB						MB					
	Car	Walk	Bus	Train	Total	% of total respondents	Car	Walk	Bus	Train	Total	% of total respondents
Centre	0	0	0	0	0	0	0	0	2	1	3	1.2
North	8	0	29	0	37	11.3	13	0	5	0	18	7.3
North east	3	0	20	1	24	7.4	5	0	7	0	12	4.8
East	11	2	31	0	44	13.5	7	0	5	0	12	4.8
South east	10	1	33	2	46	14.1	6	0	12	0	18	7.3
South	12	0	21	0	33	10.1	8	0	11	1	20	8.1
South west	14	0	24	0	38	11.7	21	1	26	0	48	19.5
West	4	0	10	0	14	4.3	11	1	11	0	23	9.3
North west	7	2	20	1	30	9.2	5	0	12	0	17	6.9
External	34	0	15	11	60	18.4	53	0	17	5	75	30.5
Total respondents	103	5	203	15	326	100.0	129	2	108	7	246	100.0
Not answered					31	9.5					26	10.6

Table 5.10 NCB and MB: Mean trip length of the journey to work by zone of origin (for all respondents using all modes from the zone)

Zone of origin	NCB		MB	
	Mean trip length (miles)	Standard deviation	Mean trip length (miles)	Standard deviation
Central	-	-	2.0	1.0
North	5.3	2.7	5.8	2.4
North east	10.0	4.7	5.0	2.9
East	5.6	2.9	7.2	5.0
South east	5.7	3.1	6.7	3.9
South	4.6	1.9	4.6	2.3
South west	4.3	4.5	4.2	1.7
West	3.1	0.9	3.7	1.6
North west	3.8	2.9	3.0	1.9
External	14.9	14.6	13.7	8.6

The distances used for these calculations are home to workplace distances estimated by the respondents.

Table 5.11. NCB and MB: Journey length by main mode of transport to work

	NCB			MB		
	Mean trip length (miles)	Standard deviation	No. trips	Mean trip length (miles)	Standard deviation	No. trips
Main mode of single mode trips						
Car	7.8	5.1	92	9.2	7.0	122
Walk	1.5	0.7	2	2.5	0.7	2
Bus	5.4	3.7	151	4.5	2.0	82
Train	15.0	-	1	-	-	-
Main mode of mixed mode trips						
Car	9.5	5.9	17	11.1	4.6	17
Walk	1.3	0.6	2	-	-	-
Bus	7.3	4.5	64	9.0	4.3	28
Train	16.1	4.2	14	22.4	15.6	7
Main mode of all trips						
Car	8.1	-	109	9.4	-	139
Walk	1.4	-	4	2.5	-	2
Bus	6.5	-	215	5.6	-	110
Train	15.9	-	15	22.4	-	7
Not ascertained	-	-	14	-	-	14

Table 5.12. Personal characteristics of respondents: Household type of respondents*

Type of household	NCB		MB		Total	
	No. of households	% of total households	No. of households	% of total households	No. of households	% of total households
Living alone	10	3.2	23	9.2	33	5.9
Self + OAP	9	2.9	3	1.2	12	2.1
Self + Adult	213	67.6	152	61.0	365	64.7
Self + Adult + OAP	6	1.9	8	3.2	14	2.5
Self + Child	3	1.0	0	0	3	0.5
Self + Child + OAP	1	0.3	1	0.4	2	0.4
Self + Child + Adult	72	22.9	61	24.5	133	23.6
Self + Child + Adult + OAP	1	0.3	1	0.4	2	0.4
Total households	315	100.0	249	100.0	564	100.0
Not answered	42		23		65	

*Children under 5 not included

Child = 5 to 16 years

Adult = 17 to 59 years (female)
17 to 64 years (male)

OAP = 60 years and over (female)
65 years and over (male)

5.1.11. Overview

The characteristics of the respondents differ between the two sites particularly in sex, age, salary structure, car-availability, driving licence possession, and origin.

Not surprisingly these differences affect travel patterns, MB's predominance of males, higher salary earners, higher car-availability, higher proportion of licence holders and longer distance travellers are reflected in the fact that MB employees are almost twice as likely to drive to work as those at NCB. Other factors, such as shortage of parking space, may of course influence this pattern. Virtually all the journeys not made by car in both cases were made by bus. Train, walk and other accounted for only 4.3% of all the train mode trips. While there are few differences between modes to and from work, the most noticeable is a slight decline in car travellers on the homeward journey at NCB compared to a slight increase in car-use at MB.

Table 5.13. Percentage of main mode trips to work by car and bus at NCB and MB: couples with and without school age children

		Car	Bus	Other
NCB	Self + Adult	34.3	56.8	8.9
	Self + Child + Adult	25.0	65.3	9.7
MB	Self + Adult	49.3	46.7	4.0
	Self + Child + Adult	54.1	26.2	19.7

5.2 Types of Car Use

5.2.1. Introduction

It should be borne in mind that, as stated in chapter one, the surveys reported here were designed to obtain information on existing car sharing schemes, ie. those which have arisen spontaneously, without the help of any matching service or incentive schemes.

While such information may be of value in designing organised car sharing schemes, the characteristics of people joining such schemes may well differ from those found here.

5.2.2. Types of car use

Table 5.14 shows the methods of car travel used by those using a car for part or all of their journey, classified by sex. The first part of the table gives the figures for those travelling by car only, whereas the second part applies to those using car as the major or minor part of a multi-mode trip.

It can be seen here that, among males, driving alone is the predominant method of car travel whereas among females, passenger with kin predominates. It is further noticeable that fewer females travel as passenger with kin on the homeward journey than on the journey to work, which ties in with Table H.1 in the previous section, where an increase in bus use by NCB females on the homeward journey was apparent. In other words, it would appear that there is a tendency for female employees to obtain a lift to work from kin, but return home by bus.

Table 5.15 illustrates the point further, where the two most common methods of car travel, as mentioned above, are shown in percentage terms. Thus of the 30 males who travel to work by car at NCB, 56.7% drive alone, and only 23.4% are passengers with kin, whereas of the 84 females in the same category, only 14.3% are solo drivers, with 60.7% travelling as passenger with kin. This pattern is broadly the same at MB.

Returning to Table 5.14, the categories "Passenger with someone else" and "Car Pooling" are interesting, as they involve most extra-household contact. At both sites, "Passenger with someone else" is used by about 20% of females who use a car, but by a much smaller percentage of males (about 7%).

Car pooling occurs only at MB and is used almost exclusively by males.

Table 5.14 Type of car/van travel to/from work by sex

	NCB to/from		MB to/from	
	Male	Female	Male	Female
Single mode trips				
Driver alone	12/14	10/10	46/47	9/9
Driver with passenger	4/4	2/3	21/15	2/2
Passenger with kin	5/4	42/29	10/13	18/19
Passenger with somebody else	0/1	14/13	7/8	1/8
Car pooling	0/0	0/0	6/6	1/0
Mixed mode trips				
Driver alone	5/4	2/2	3/3	2/2
Driver with passenger	1/1	1/1	3/3	0/1
Passenger with kin	2/2	9/5	4/3	6/2
Passenger with somebody else	1/1	4/1	0/0	4/0
Car pooling	0/0	0/0	1/1	0/0
Single and mixed mode				
Driver alone	17/18	12/12	49/50	11/11
Driver with passenger	5/5	3/4	24/18	2/3
Passenger with kin	7/6	51/34	14/16	24/21
Passenger with somebody else	1/2	18/14	7/8	5/8
Car pooling	0/0	0/0	7/7	1/0
Total car trips	30/31	84/64	101/99	43/43
Passengers in above categories sharing expenses	2/2	1/2	2/2	4/2

Notes:

1. "Passenger with kin" here includes the insignificant groups "Passenger with kin and someone else" and "Passenger with kin and carpooling". Likewise "Passenger with someone else" here includes "Passenger with someone else who is carpooling".
2. The figures under "mixed mode trips" in this and subsequent tables include all those using car for any part of the journey. The numbers are therefore greater than the number of mixed mode car trips given in Table 5.3 where only the major modes are tabulated.

5.2.3. Types of car use by salary level

Table 5.16 (from Table H.5) shows the relationship between salary and car use. The points to make here are that the prevalence of "passenger with kin" declines with increasing salary at both survey sites, perhaps because females are less represented at higher salaries. Car pooling is confined to MB and it is noticeable from Table H.5 that it occurs almost exclusively in the highest salary range. The proportion driving alone increases slightly with increasing salary, whereas the proportion sharing with other than kin (Table H.5) is highest in the middle salary ranges.

5.2.4 Types of car use by journey length

The effect of journey length on car sharing is shown in Table 5.17, where the length of the whole journey from home to work (as reported by the respondents) is tabulated against the type of car travel. Table 5.17 shows an above average trip length for solo drivers at both sites, although the difference is not very marked. The average trip length for car pooling journeys is significantly above the average for single mode trips. Apart from these points, there would appear to be no strong relationships between journey length and type of car travel at these sites.

Table 5.15 Percentage of car users for the journey to work at NCB and MB driving alone or travelling as passenger with kin: by sex

		Drive alone	Passenger with kin	Other
NCB	Male	56.7	23.4	19.9
	Female	14.3	60.7	25.0
MB	Male	48.5	13.9	37.6
	Female	25.6	55.8	18.6

Table 5.16 Percentage of car users for the journey to work at NCB and MB driving alone or travelling as passenger with kin: by salary

		Drive alone	Passenger with kin	Other
NCB	< £2500	33.3	55.5	11.2
	£2500-£5000	22.6	52.2	25.2
	£5000-£7500	40.0	30.0	30.0
	> £7500	50.0	33.3	16.7
	< £2500	33.3	66.7	0.0
	£2500-£5000	28.2	53.9	17.9
	£5000-£7500	45.2	16.1	38.7
	> £7500	50.0	14.1	35.9

Table 5.17 NCB & MB: Journey length by type of car/van travel to work

	NCB			MB		
	Mean trip length (miles)	Standard deviation	No. trips	Mean trip length (miles)	Standard deviation	No. trips
Single mode trips						
Driver alone	9.0	7.5	3	9.7	8.0	55
Driver with passenger	10.5	5.2	6	7.3	5.5	23
Passenger with kin	6.8	4.2	48	7.8	5.0	26
Passenger with someone else	6.1	3.7	17	10.0	6.8	7
Car pooling	-	-	-	14.8	7.1	10
Not ascertained	4.2	3.2	6	3.5	0.7	2
Mixed mode trips						
Driver alone	13.1	6.9	7	19.6	16.3	5
Driver with passenger	7.0	2.8	2	21.3	16.3	3
Passenger with kin	9.3	5.0	11	10.0	5.9	10
Passenger with someone else	11.8	6.4	5	12.8	4.0	4
Car pooling	-	-	-	12.0	-	1
Single & mixed mode trips						
Driver alone	10.0		30	10.5		60
Driver with passenger	9.6		8	8.9		26
Passenger with kin	7.3		59	8.4		36
Passenger with someone else	7.4		22	11.0		11
Car pooling	-		-	14.5		11
Not ascertained	4.2		6	3.5		2

Notes:

1. "Passenger with kin" here includes the insignificant group "Passenger with kin and someone else". Similarly, "Car pooling" here includes "Driver with passenger and pooling"; "Passenger with kin and pooling"; "Passenger with someone else and pooling"; "Passenger with kin and someone else and pooling".
2. The total no. of single mode car trips shown here is slightly more than that shown in Table 5.15. This is because a few respondents who normally travel by car completed the section on "type of car travel" although they did not use a car on the survey day.

5.2.5. Types of car use by household type

Table 5.18 (from Table H.6) shows the percentages by main type of car use for the main household types. As noted in para. 5.1.10, there is no clear pattern to these figures.

Table 5.18 Percentage of car users for the journey to work at NCB and MB driving alone or travelling as passenger with kin: by household type

		Drive alone	Passenger with kin	Other
NCB	Self + adult	22.0	54.9	23.1
	Self + child + adult	27.8	50.0	22.2
MB	Self + adult	33.3	34.6	32.1
	Self + child + adult	45.7	20.0	34.3

5.2.6. Type of car use by availability of transport facilities

Table 5.19 shows that company car users at MB are more likely to drive alone than their co-workers who drive their own cars. Data for NCB is insufficient to draw any conclusions.

Table 5.20 indicates that parking is concentrated in the company car park at MB. At NCB the small employer's car park was for essential users only. Thus most drivers parked on street or in a public car park. A slight majority of NCB passengers reported parking in a company car park, but it should be noted that this refers to the driver's workplace, which is probably not the same as the passenger's.

Not surprisingly Table 5.21 indicates that the large majority of car users at MB park free. A similar question was not asked at NCB.

Table 5.22 indicates, for MB users, their estimated costs of public transport use. These figures reflect the low fares policy of South Yorkshire County Council (even though some improbably high fares are quoted). Only 23 out of 138 respondents (16.7%) stated that public transport would cost more than £1 per day. Additionally, it is noticeable that the mean public transport fare which would be paid is much greater for car poolers (85p) than for all categories combined (56p). In contrast, the mean fare for "passenger with kin" is much lower than average (41p).

Table 5.23 shows, for MB alone, availability of telephone by car use. Telephone availability is universally high, and complete among passengers

with someone else and car poolers, where clearly it is more important to the journey.

5.2.7. Car sharer/pooler characteristics at Midland Bank

The answers to the additional questions asked of car sharers/poolers at MB are presented in Tables 5.24-30. Only those who identified themselves as car sharers or poolers according to the questionnaire's definition*, are included. For this reason totals are lower than in Table 5.14.

Table 5.24 shows that, for all car sharing/pooling schemes at MB, the mean duration of schemes still in operation is 24.7 months. For those who are always the driver, the figure is slightly higher (26.0) and for those who are always the passenger, slightly lower (23.8).

Table 5.25 shows that the vast majority of schemes of all types operate for five days a week, and none for less than 3 days.

Table 5.26 shows that overall, convenience was the main reason for forming car sharing arrangements. However, for those who alternated driving and riding, the main reason given was to reduce travel costs. This difference is quite marked, and is probably due to a preponderance of arrangements with kin in the "Always driver" and "Always passenger" categories, where no money changes hands. This is reinforced by the mention of family ties in these categories. It is notable that other reasons, including alternative use of the family car, are generally unimportant.

Table 5.27 shows that publicity does not seem to have played an important part in the formation of car sharing arrangements. Car sharing arrangements were almost all spontaneous arrangements entered into by relatives and friends. Alternate driver/passenger arrangements arose predominantly through work-based friends, whereas always-driver and always-passenger arose mainly through relatives.

... ...

*A car-sharing scheme is defined as giving or receiving lifts to and/or from work on a regular basis (including members of your own family).
A car pooling scheme is defined as a regular arrangement between car owners who take turns to drive their own car and give a lift to the other(s).

Table 5.19 Use of a company car by type of car/van travel

	respondents having use of a company car	% of total respondents having use of a company car	respondents not having use of a company car	% of total respondents not having use of a company car
(a) NCB				
Type of car/van travel				
Driver alone	0	0.0	28	36.3
Driver with passenger	1	25.0	7	9.1
Passenger with kin	3	75.0	31	40.3
Passenger with somebody else	0	0.0	9	11.7
Car pooler	0	0.0	0	0.0
Total respondents	4	100.0	77	100.0
(b) MB				
Type of car/van travel				
Driver alone	16	69.6	40	41.2
Driver with passenger	3	13.0	18	18.6
Passenger with kin	3	13.0	20	20.6
Passenger with somebody else	0	0.0	9	9.3
Car pooler	1	4.3	10	10.3
Total respondents	23	100.0	97	100.0

Table 5.20 Parking location by type of car/van travel

	NCB				MB			
	Company car park	Other private car park	Public car park	On street	Company car park	Other private car park	Public car park	On street
Driver alone	3	0	10	17	44	1	5	10
Driver w/passenger	2	0	4	2	17	0	2	5
Passenger with kin	25*	1	6	19	19*	0	5	6
Passenger with some-one else	11*	0	1	3	9*	0	1	0
Car pooler	0	0	0	0	11	0	-	0
TOTAL	41	1	21	41	100	1	13	21

*NB these refer to the driver's company car park

Table 5.21 Parking cost by type of car/van travel (MB only)

Parking cost (pence)	0	1-15	16-30	31-45	46-60
Driver alone	53	1	2	-	1
Driver with passenger	23	-	2	-	-
Passenger with kin	24	1	3	-	-
Passenger with somebody else	10	-	-	-	-
Car pooler	11	-	-	-	-
TOTAL	121	2	7	0	1

Table 5.22 Cost of public transport if it were used by car-users by type of car/van travel (MB only)

Cost (pence)	0-20	21-50	51-100	101-200	>200	Mean fare
Driver alone	26	7	10	7	4	65p
Driver with passenger	15	3	4	1	1	42p
Passenger with kin	16	9	7	3	0	41p
Passenger with somebody else	3	3	3	2	0	60p
Car pooler	2	3	2	5	0	85p
TOTAL	62	27	26	18	5	56p

Table 5.23 Use of a telephone by type of car/van travel (MB only)

	Use of Telephone		
	Yes	No	% Yes
Driver alone	57	3	95.0
Driver with passenger	25	1	96.1
Passenger with kin	31	5	86.1
Passenger with somebody else	11	0	100.0
Car poolers	10	0	100.0
TOTAL	134	9	93.7

Table 5.24 Number of months car sharing arrangement has been in operation (MB only)

No. months	Always driver	Always passengers	Alternate driver/ passenger	Total
0 - 5	0	2	2	4
6 - 10	3	1	4	8
11 - 15	2	7	2	11
16 - 20	3	5	1	9
21 - 25	1	1	0	2
26 - 30	1	1	1	3
31 - 35	0	0	0	0
36 - 40	4	1	3	8
41 - 45	0	1	2	3
46 - 50	3	2	3	8
Over 50	0	3	0	3
Total	17	24	18	59
Mean duration	26.0	23.8	24.7	24.7

Table 5.25 MB car sharers: no. days per week arrangement is in operation

No. days/week	Always driver	Always passenger	Alternate driver/ passenger	Total
1	0	0	0	0
2	0	0	0	0
3	2	2	0	4
4	1	1	1	3
5	13	20	15	48
6	1	0	0	1
Varies	0	0	2	2
No response	0	1	0	1
Total	17	24	18	59

Table 5.26 MB car sharers: reasons for forming arrangement

	Always driver	Always passengers	Alternate driver/ passenger	Total
Permits other use for family car	2	3	2	7
Social	1	2	1	4
Convenience	12	17	8	37
Reduced travel cost	4	9	15	28
Family Ties	6	9	3	18
Other	2	0	3	5
Total	27	40	32	99

Table 5.27 MB car sharers: how arrangement arose

	Always driver	Always passenger	Alternate driver/ passenger	Total
Publicity - notice at work	0	0	1	1
Home-based friends	3	7	4	14
Work-based friends	5	2	13	20
Relatives	10	16	3	29
Total	18	25	21	64

Table 5.28 MB car sharers: important factors in forming arrangement

	Always driver	Always passenger	Alternate driver/ passenger	Total
Start/finish work times	12	15	10	37
Amount of route diversion	2	1	4	7
Personal characteristics (eg. smoker/non-smoker)	1	0	1	2
Other	3	8	2	13
Total	18	24	17	59

Table 5.29 MB car sharers: effect of picking up passenger on journey time of driver

	Always driver	Always passenger	Alternate driver/ passenger	Total
No effect	11	-	7	18
+ 2 mins	2	-	3	5
+ 5 mins	1	-	3	4
+ 10 mins	-	-	2	2
Total	14	-	15	29

Table 5.30 MB car sharers: mode used before arrangement came into operation

Journey stage	Mode			
	Walk	Car	Bus	Train
1st	4	25	17	4
2nd	2	1	3	3
3rd	4	0	0	1
4th	1	0	0	0

Table 5.28 shows that start/finish work times are by far the most frequently mentioned factor in deciding whether to form an arrangement. Route diversion and personal characteristics are given very little weight, but this is almost entirely due to the preponderance of arrangements with kin, where route diversion at the home end does not arise and the characteristics of the partners are well known in advance of considering the arrangements.

This theory is supported by considering that route diversion is given most importance by alternate driver/passenger schemes, where there is obviously some diversion involved.

It should be noted that cases where the amount of route diversion was so great as to prevent the arrangement being formed, are not reported. Table 5.29 shows that most drivers stated that their journey times were not affected by picking up their passengers. (This no doubt, once again, reflects the fact that most passengers are from the same household). No diversions of more than 10 minutes were reported.

Table 5.30 shows that the highest proportion of existing car sharers travelled by car as main mode before forming an arrangement, with bus contributing the most from the other modes.

5.2.8. Alternative modes if normal mode unavailable

Tables 5.31 and 5.32 show this information for NCB, and Tables 5.33 and 5.34 for MB.

Table 5.33 shows that the majority of bus passengers at MB would travel by car if bus were unavailable, whilst the majority of car travellers would go by bus. Rail becomes a significant mode as an alternative.

Table 5.31 shows the same cross-correlation for NCB as it does for MB, but the majority of bus passengers would walk to/from work, with a slightly smaller proportion travelling by car. Rail again figures significantly.

Tables 5.32 and 5.34 show respectively for NCB and MB how types of car traveller would travel if car were unavailable. The main feature of both tables is the predominance of bus as an alternative.

Table 5.31 NCB: Alternative mode if normal mode unavailable (all respondents)

Main mode of travel on survey day	Stated alternative mode to/from work						
	car	cycle	walk	bus	rail	taxi	total
Car	11 10	0 0	1 3	82 64	7 8	2 2	103 87
Cycle	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Walk	1 1	0 0	1 1	1 1	0 0	0 0	3 3
Bus	65 62	1 1	72 67	9 20	20 19	8 9	175 178
Rail	1 0	0 0	0 0	12 11	1 0	0 0	14 11
Taxi	0 0	0 0	0 1	0 0	0 0	0 0	0 1
Total	78 73	1 1	74 72	104 96	28 27	10 11	295 280

Table 5.32 NCB: Alternative mode if normal mode unavailable (for those using car for part/all of journey)

Method of car travel on survey day	Stated alternative mode to/from work					
	car	walk	bus	rail	taxi	total
Solo driver	3 3	0 0	20 22	4 3	1 1	28 29
Driver with passenger	1 0	0 0	5 7	1 1	1 1	8 9
Passenger with kin	3 0	3 3	48 33	3 2	0 0	57 41
Passenger with someone else	3 2	1 0	15 12	0 1	0 0	19 15
Total	10 8	4 3	88 74	8 7	2 2	112 94

Table 5.33 MB: Alternative mode if normal mode unavailable (all respondents)

Main mode of travel on survey day	Stated alternative mode to / from work							
	car	m/c	cycle	walk	bus	rail	taxi	total
Car	18 / 19	0 / 0	1 / 2	2 / 5	87 / 89	24 / 22	1 / 1	133 / 138
Walk	1 / 0	0 / 0	0 / 0	0 / 0	1 / 1	0 / 0	0 / 0	2 / 1
Bus	42 / 46	1 / 1	1 / 0	26 / 21	11 / 9	15 / 16	1 / 1	97 / 94
Rail	3 / 1	0 / 0	0 / 0	0 / 0	3 / 3	1 / 1	0 / 0	7 / 5
Taxi	0 / 0	0 / 0	0 / 0	0 / 0	0 / 1	0 / 0	0 / 0	0 / 1
Total	64 / 66	1 / 1	2 / 2	28 / 26	102 / 103	40 / 39	2 / 2	239 / 239

Table 5.34 MB: Alternative mode if normal mode unavailable (For those using car for part/all of journey)

Method of car travel on survey day	Stated alternative mode to / from work						
	car	cycle	walk	bus	rail	taxi	total
Solo driver	8 / 10	0 / 0	1 / 1	38 / 39	11 / 10	0 / 0	58 / 60
Driver with passenger	3 / 1	1 / 1	1 / 1	17 / 13	3 / 2	0 / 0	25 / 18
Passenger with kin	4 / 3	0 / 1	0 / 1	23 / 21	4 / 4	0 / 0	31 / 30
Passenger with * someone else	3 / 5	0 / 0	0 / 2	7 / 12	2 / 2	0 / 0	12 / 21
Car pooling **	0 / 0	0 / 0	0 / 0	4 / 3	6 / 6	1 / 1	11 / 10
Total	18 / 19	1 / 2	2 / 5	89 / 88	26 / 24	1 / 1	137 / 139

* Includes passenger with kin and someone else

** Includes car pooling with kin and/or someone else

5.3 Journey to work and the effects of flexible work hours

5.3.1. As the respondents at both sites were working a flexible work hours system, the results will be discussed taking the two samples as a whole.

Table 5.35 shows the reasons given by employees for delays at work - before starting and after finishing work. Bus users experience delays of this sort more frequently than people travelling by car. Bus users seem to regard these as involuntary delays, ascribing them to bus and train times. The main reason why car users were delayed, however, is ascribed to a voluntary action - giving or receiving a lift.

5.3.2. Table 5.36 shows the effect of flexible work hours on journey times to and from work by main mode. Overall, 30.4% of respondents stated that their journey time had been shortened because of flexible work hours while only 1.3% said their journey now took longer.

More than a third of car users experienced shorter journey times travelling to and from work. This is probably due to the increased ability of car users working FWH to choose travelling times which avoid the heaviest traffic.

Just over one quarter of bus users stated that their journey time was now shorter because of flexible work hours. This proportion is slightly lower than that for car users, possibly due to the inflexibility of public transport timetables. This also applies to train travellers, only 12.9% of whom reported a shorter journey time as a consequence of flexible work hours.

Table 5.35 Reasons for waiting at work: before starting work and after finishing work (all respondents NCB and MB)

	NCB and MB - reasons for waiting - before work				
	Bus/train times	Giving/ receiving a lift	Other	Total	Total persons using mode as main mode
Main mode to work					
Car	6	13	6	25	248
Walk	1	0	0	1	7
Bus	44	4	1	49	315
Train	0	0	0	0	22
Total	51	17	7	75	592

	NCB and MB - reasons for waiting - after work				
Main mode from work					
Car	6	12	4	22	235
Walk	1	0	0	1	5
Bus	33	2	2	37	326
Train	1	0	0	1	17
Total	41	14	6	61	583

Table 5.36 Effect of flexible work hours on journey time to/from work by percentage of all respondents (NCB and MB combined) using mode

	Car	Walk	Bus	Train	Other	All modes
(a) To work						
Shortened	36.7	28.6	27.5	10.5	-	30.5
No effect	61.2	71.4	72.1	89.5	-	68.4
Lengthened	2.0	0.0	0.4	0.0	-	1.2
Total	100.0	100.0	100.0	100.0	-	100.0
Number	196	7	269	19	0	491
(b) From work						
Shortened	37.1	16.7	27.4	12.5	0	30.3
No effect	60.6	66.7	71.9	87.5	100.0	68.2
Lengthened	2.3	16.7	0.7	0.0	0.0	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	175	6	274	16	1	472

5.4 Results of interviews

5.4.1

The following conclusions can be drawn from assessing the advantages and disadvantages of the interviews over the questionnaires:

- The data collected by the interviews was of a more qualitative and anecdotal nature than that collected by questionnaires.
- The anecdotal nature of the data, the small sample size within groups and the fact that there was a 14 week time lapse between questionnaire and interview make it statistically unreliable.
- When comparing the results of the interview questions with the results of the same questions on the extended questionnaire, it can be said that the questionnaire is the more successful in terms of the amount of quantifiable information obtained.
- Through comparing the experiences of interviewing as against using questionnaires, it is thought that respondents approach interviews and questionnaires in different ways. In an interview the interviewee feels that he or she has to make an immediate response, and this tends to detract from the reliability of the answers. In a questionnaire, however, there appears to be more time to think, and hence there is a higher probability of a more accurate response.

The findings of the interviews are presented below by traveller type.

5.4.2 Car passenger receiving lift with kin

The majority of these interviewees travelled both to and from work with husbands or fathers. The arrangements tended to arise from a combination of convenience and reducing travel costs. Obviously, however, there were more complicated arrangements within this somewhat general picture, such as the interviewee who received a lift to work from her father on the days when her mother worked (part-time job 3 days per week). When her mother was not working she caught the bus to and from work. In the evenings when her mother had been working the interviewee walked to her mother's office to get a lift home with her father. The days when she used public transport tended to be longer as she was not so constrained by travel times and used the extra time to work up credit on the FWH system. One person in this category said she was sharing

expenses with her driver, but as the arrangement was not regular, ie. 2 or 3 days per week, the amount paid varied. It was calculated to cover petrol costs.

Difficulty was again experienced in obtaining answers to questions concerning how the arrangement arose and what was taken into consideration when forming the arrangement. The question 'How do you rendezvous with your driver' was largely superfluous in this category.

5.4.3 Car passengers receiving lift with somebody else

Two interviewees were in this category. These arrangements differed widely from each other. One was a regular agreement whereby the lift to work was given by a neighbour, and the lift from work by the husband. The lift with the neighbour arose out of the bus stoppage (as mentioned in 2.3) and has continued on a regular basis. The other arrangement consisted of the interviewee being given a lift to work if the driver passed her walking down the street. Otherwise she caught the bus.

No real problems were experienced with any of the questions in this category, although in the case of the irregular lift some proved irrelevant, eg. those concerning how the arrangement arose and the reasons for forming the arrangement.

5.4.4 Car driver alone

Four interviewees were in this category. The main information obtained from this category was concerned with influences on the time of leaving home for work, eg. having to take children to school and avoiding congestion on the work journey and in the car parks. No anecdotal information was obtained as there were no complicated lift giving or receiving arrangements. No problems were experienced with any of the questions.

5.4.5 Car driver giving lift

Four interviewees were in this category. Arrangements were with kin, with the reasons for forming the arrangement given as 'Family' and 'Social'. The influences on the time of leaving home for work were all to avoid congestion on the journey, with one being further constrained by the passenger working fixed hours. One extremely complicated arrangement emerged, whereby the interviewee occasionally received a lift to work from her father, catching the bus home. When she drove herself to work she occasionally gave a lift home to a friend; the pattern of when she drove or received a lift seemed to have no regularity.

No difficulty was experienced with any of the questions, and there were no examples of compensation being received from the passenger.

5.4.6 Public transport passengers

Sixteen interviewees were in this category. This section was the most straightforward of all. One interesting point that emerged was that during the bus stoppage some of these interviewees received lifts to and from work from family or friends, but none of these arrangements lasted. The reasons for the breakup of these temporary arrangements could not be ascertained except for one case where the lift-giver moved house shortly after the end of the strike. Other interviewees merely stated that when services were resumed they returned to travelling by bus.

Some of the interviewees owned cars, but found it cheaper and more convenient to travel by bus. Occasional lifts from family or friends occurred in most cases, but circumstances such as work times or distance seemed to have been against the formation of regular car sharing arrangements.

No difficulties were experienced in any of the questions, although some, such as whether the interviewee arrived at the office before starting work, proved for the most part inapplicable as the majority of replies were negative.

5.4.7 Overview

The technique has elicited some very detailed information about travel habits, much of it anecdotal and hence difficult to quantify and compare. The facility for being able to follow up interesting points was widely used in the interviews, and whilst this is thought to be of great use in a detailed behavioural study, it is questionable how useful it has proved in a quantitative assessment of travel habits.

Question relevance proved to be more of a problem than was first anticipated. The questions were included to provide information comparable to that collected by the Extended Questionnaire, but in the event some proved to be irrelevant to many interviewees. In particular, those questions relating to how car-sharing arrangements arose, the reasons for forming the arrangement, and what was taken into consideration when forming the arrangement were noticeably poorly answered. It is postulated that the main reason for this is that the majority of arrangements were with family members and hence were not the result of a 'considered decision'.

6. CONCLUSIONS (1) WORK JOURNEY CHARACTERISTICS

6.1 Introduction

As noted in section 1.2, the main objective of this study was to obtain information on the proportion and characteristics of existing car-sharers and poolers at an office complex with flexible work hours and restricted parking. It is intended that these should be compared in due course with results of a similar study carried out by the Department of Transport (TAU 1979). In the meantime the opportunity has been taken to compare them with other studies of existing (pre 1980 Transport Act) car-sharers (Vincent and Wood 1979) and with work at the Institute on potential car sharers (Bonsall 1980a) and on new car-sharers attracted by Bonsall 1980b organised car sharing schemes (Bonsall, Spencer and Tang 1981).

This chapter summarises the characteristics of the offices surveyed and of the car sharers identified in this study and compares them with these other results.

6.2 Characteristics of surveyed offices and employees

6.2.1. Office characteristics

Table 6.1 summarises these and indicates that the main differences of importance are that MB is newly located in Sheffield (from London) and has much more generous parking provision. Both might be expected to influence journey to work patterns.

6.2.2. Employee characteristics

Table 6.2 indicates that the main differences are in sex, salary and, to a lesser extent, age group; NCB employees are predominantly female, from lower income levels and more likely to come from younger or older age groups. There are no significant differences in household type. The differences identified here are again likely to influence journey to work patterns. This is immediately evident in differences in car availability and possession of a full driving licence although, as Tables 5.2 and 5.7 indicate, differences in sex and salary structure do not explain all the differences in these characteristics; females in any salary range seem less likely to have the use of a car or a driving licence at NCB than at MB. It may be that these differences result from the differences between NCB and MB offices identified in 6.2.1. above.

Table 6.1 Characteristics of surveyed offices

Office	NCB	MB
Type of Undertaking	Public sector	Private
Predominant type of work	Administrative/ clerical	Administrative/ clerical
Location	City centre	City centre
Length of time operating in current location	11 years	4 years
Number of employees	380	1500
Number on flexible working hours	380	1500
Length of time on FWH	2 years	4 years
Number of private parking spaces	15	396
Adjacent public parking	Limited	Limited
Public transport service	Excellent	Excellent
Organised car sharing scheme?	No	No

Table 6.2 Characteristics of surveyed employees

Office	NCB	MB
Number of employees	380	1500
% male	19.9	59.6
% under 21	22.2	10.3
% over 50	12.8	7.0
% under £2500	14.5	4.9
% £2501 - £5000	77.1	36.4
% £5001 - £7500	5.7	25.5
% over £7500	2.7	33.2
% in self + adult households	67.6	61.0
% in self + child + adult households	22.9	24.5
% living alone	3.2	9.2
% with car available	58.3	80.8
% with full driving licence	46.5	77.8

6.3 Employees' journey to work

6.3.1. General

Table 6.3 indicates that in all categories by sex and income level where there were substantial numbers of respondents NCB employees are less likely than those at MB to use cars for the journey to work. The reverse picture is found for bus use. It is possible that these differences are due to the shortage of parking space at NCB.

Table 6.3 Journey to work characteristics of surveyed employees

Office	NCB	MB
% travelling by car of		
- all respondents	31.8	53.9
- male respondents	39.4	61.4
- female respondents	29.6	42.0
- respondents earning < £2500	20.0	(30.0)
- respondents earning £2500 - £5000	28.9	45.9
- respondents earning £5001 - £7500	(58.9)	44.3
- respondents earning > £7500	(85.7)	75.0
- male respondents earning*		
- £2500 - £5000	26.3	50.0
- £5001 - £7500	(62.5)	39.0
- > £7500	(75.0)	75.6
- female respondents earning*		
- < £2500	17.6	(30.0)
- £2501 - £5000	28.7	44.1
- £5001 - £7500	(62.5)	55.0

( ) : based on a small number of respondents.

* : other income categories had only a few respondents.

6.3.2. Employees' car use characteristics

Table 6.4 indicates the type of car use of those travelling to work by car. It is clear that female car users generally are much less likely to drive than males; this makes it important to consider the types of car use separately by sex. While the proportion of males using cars is lower at NCB, the type of car use by males is similar at both sites, with around three quarters driving. For females not only is the proportion using cars less at NCB, but so is the proportion of these who drive; female car users at MB are almost twice as likely as those at NCB to drive to work. Because of the small numbers in individual car use and salary categories, it is not possible to say whether these differences are due to salary structure, but

it seems likely that they are influenced in part by differences in parking availability.

Other characteristics of those using cars in different ways are summarised in the following paragraphs.

Table 6.4 Car journey to work characteristics of surveyed employees

Office	NCB	MB
% by car (all)	31.8	53.9
% of all car users		
(a) driving alone	25.4	41.6
(b) with passenger	7.0	18.1
(c) passenger with kin	50.9	26.4
(d) passenger with other	16.7	8.3
(e) car pooling	0.0	5.6
(f) driving at all (a, b, e)	32.4	65.3
% by car (males)	39.4	61.4
% of all male car users		
(a) driving alone	56.7	48.5
(b) with passenger	16.7	23.8
(c) passenger with kin	23.4	13.9
(d) passenger with other	3.3	6.9
(e) car pooling	0.0	6.9
(f) driving at all (a, b, e)	73.4	79.2
% by car (females)	29.6	42.0
% of female car users		
(a) driving alone	14.3	25.6
(b) with passenger	3.6	4.6
(c) passenger with kin	60.7	55.8
(d) passenger with other	21.5	11.6
(e) car pooling	0.0	2.3
(f) driving at all (a, b, e)	17.9	32.5

6.3.3. Solo driving

This was the main method of car travel among males, but a relatively minor one for females. Those in higher salary ranges, with the use of a company car or with a longer journey to work were more likely to drive alone.

6.3.4. Driver with passenger

This was a relatively minor mode; it was more common among males, and at higher salary levels.

6.3.5. Passengers with kin

This was the main method of car travel among females, but a relatively minor one for males. It was more common among those in lower salary ranges and with shorter work journeys (and hence lower alternative bus fares).

6.3.6. Passengers with other than kin

This was a relatively minor mode; it was more common among females, and, like passenger with kin, those with shorter work journeys, but did not appear to vary significantly by salary level.

6.3.7. Car poolers

This form of travel was found only at MB, where it was confined almost exclusively to males in the highest salary band. This group also had longer than average journeys to work.

6.3.8. Characteristics of car sharing arrangements

All types of car use other than driving alone involve some form of car sharing. They represent 74.6% of all car journeys, and 23.8% of all journeys to work at NCB, and 58.4% and 31.5% respectively at MB. Among these, 'passenger with kin' predominated. Factors involved in the formation of car sharing arrangements at MB were obtained from the 'extended questionnaire'. The following points emerged:-

(i) The most common reason for forming car pooling schemes was to reduce travel costs, whereas for other forms of sharing the main reason was 'convenience'. This reflects the high proportion of arrangements with kin in the non-pooling schemes.

(ii) Pooling arrangements arose mainly through work-based friends whereas other schemes arose mainly through relatives. Publicity played an insignificant role in the formation of existing schemes.

(iii) Work times were considered an important factor in deciding whether or not to form a scheme, for all types of scheme. Route diversion did not figure very highly, but this may be because those schemes where it was considered important were not formed (hence not surveyed). No route diversions of greater than 10 minutes were found - this may indicate the acceptable limit.

(iv) Personal characteristics of the other scheme members (eg. whether smoker or not) were not significant, but this is probably because members of spontaneously formed schemes such as here, already know each other before the car sharing arrangement is proposed.

(v) Compensation to drivers was found to be very rare even among car poolers, which were the only group where reducing travel costs was given as the main reason for forming the scheme.

6.4 Effects of flexible work hours

6.4.1. General effects

A subsidiary objective was the study of the effect on car sharing of flexible working hours. It is clear from Table 5.36 that flexible work hours had a beneficial effect on journey times to and from work; over 30% reported reduced journey times, while only 1% reported an increase. Car users were more likely to benefit (and to suffer, though numbers were small) than users of other modes. Train users were significantly less likely to benefit. It is to be expected that flexible work hours would enable employees to avoid arriving early for work or having to wait before leaving. Only 12.7% reported arriving early, and 10.5% waiting before leaving; the majority of these (8.6% and 7.0% respectively) were doing so because of bus or train times (Table 5.35).

6.4.2. Effects on car sharing

There is little evidence that flexible work hours are a serious constraint on car sharing arrangements. Only 5.2% of car users arrived early because they were giving or receiving lifts, and only 5.1% waited after work to do so (Table 5.35). While start and finish times were important in forming arrangements (Table 5.28) it is to be expected that greater flexibility in work hours would ease this constraint on car sharing.

6.5 Comparison with other studies

6.5.1. Existing car sharers

Vincent and Wood (1979) produce estimates from the 1975/6 NTS of the extent of car sharing before the 1978 and 1980 Transport Acts. They analysed all 'stages' in the two hour am and pm peaks, rather than studying directly journeys to work, and found that car users represented 66% of these, compared with 31.8% at NCB and 53.9% at MB. It is not surprising that a survey which represented rural and small urban areas as well as conurbations should have a larger proportion of car users, but

it is interesting to note that the MB figure is nor far short of the 1975-6 national average.

If car users are isolated, the results obtained are as indicated in Table 6.5, which compares them with NCB and MB results.

Table 6.5 Types of car use on the journey to work* - NTS, NCB and MB surveys

	NTS	NCB	MB
Driver alone) with passenger)	58	32.4	59.7
Passenger with kin	21	50.9	26.4
Passenger with other	15	16.7	8.3
Car pooling	6	0.0	5.6

*NTS data are for am and pm peak period journey stages, rather than just journey to work.

It is again noticeable that the MB figures are close to the 1975-6 national average; those at NCB differ particularly in that they have a much higher percentage travelling as passengers with kin.

6.5.2. Potential car sharers

Bonsall (1980a) carried out a survey in West Yorkshire in 1978 to determine interest in car sharing. He found that interest in car sharing was approximately equally divided between those wishing to receive lifts, give lifts and pool, and that public transport users were more likely than car users to be interested in car sharing. He also noted that the characteristics of potential car sharers and those existing car sharers whom he identified in his survey differed; potential car sharers had a longer mean trip length. 64% of existing car sharers were giving lifts (as opposed to around a third of would-be sharers) and almost half of these were giving lifts to household members. It would appear, therefore, that surveys of existing car sharers do not necessarily give a clear guide to the characteristics of those who might be interested in an organised scheme, nevertheless they do illustrate the need for enhanced incentives for such schemes.

6.5.3. Car sharers attracted by organised schemes

Bonsall (1980b) used his survey results to predict the likely response to an organised car sharing scheme for employees in Leeds city centre. He predicted that only 19% of applicants (or 1.5% of the target population) would actually share, and that of these 52% would receive lifts, 33% give lifts and 15% pool. These figures are again close to those for the MB

results. He predicted a 42% switch from public transport, a figure identical to that obtained for MB in Table 5.30.

More recently Bonsall, Spencer and Tang (1981) have tested these predictions in practice at Leeds City Council's offices in the city centre. 6.8% of the target population applied to share, with 39% wishing to drive, 40% to ride and 21% to pool. 2.0% of the target population actually shared, with a rather higher percentage than predicted, 33% pooling. Around 30% of sharers had previously used public transport and, interestingly, 80% had not known one another prior to the scheme. This last point is important, because it suggests that, whereas there is a superficial similarity between the predicted participants and existing MB sharers, in practice sharers resulting from organised schemes are much less likely than those identified in the NCB and MB surveys to know one another before sharing. Pre-existing sharers were excluded from the study.

6.5.4. Summary

In summary, it is noticeable that MB results are in many ways similar to those for existing car sharers nationally, whereas NCB results are not, suggesting that NCB may be unusual perhaps because of the restricted parking which it has available. It would be useful to test this hypothesis at other sites with restricted parking.

Superficially there appear some similarities, too, between MB data and those for predicted and actual results of organised car sharing schemes. Too much emphasis should not be placed on these similarities, however, because evidence suggests that those expressing an interest in organised car sharing, and those actually participating in organised schemes, differ in several respects from those who are already car sharing. If this is the case, then surveys such as the present one, while being useful in helping to understand an existing phenomenon, are unlikely to provide reliable predictions of the best target populations for organised schemes.

7. CONCLUSIONS (2) SURVEY TECHNIQUES

7.1 Introduction

As noted in section 1.2 one of the objectives of the study was to provide advice on the relative merits of questionnaire and interview survey techniques and the appropriateness and relative importance of data items collected and to provide recommendations for future surveys. In making these comments it is important to note that the survey format and data requirements were constrained to be compatible with those of previous DTp surveys; this inevitably limited the opportunities for omission of less important information and hence, because of the length of the surveys, for inclusion of additional questions.

7.2 Choice between questionnaire and interview

7.2.1. Technique effectiveness

As stated in the section of the report dealing with the results of the interviews, there is an appreciable difference in the type of information obtained through the two techniques. It was intended that a small questionnaire plus interviews should provide data comparable to that collected by a larger questionnaire. In practice, however, as this section goes on to show, this was not the case.

It is considered important at this stage to discuss the type of information required from a travel survey with regard to the techniques employed.

If one is conducting a survey in which the intention is to collect hard fact and practical details of travel behaviour, one needs to have the respondent in a relaxed frame of mind where no apparent stress is present to force a swift, and perhaps inaccurate, response. It is our opinion that people need time to think about details of their journey (time and distance in particular), and are more likely to give an accurate answer where these conditions are met. It is postulated that a written questionnaire fulfils these conditions in that there is no person-to-person contact involved, and hence no obvious need to hurry an answer.

Where more qualitative information is required, ie. where one is asking for details of a complicated behaviour pattern, or for perceptions of activities and their associated constraints, such as the factors governing decisions on when and how to travel, it is our opinion that an interview constitutes the most appropriate means. There are two reasons for this: firstly, the interviewee is not limited by the amount of space

available for his answer (although the interviewer may be), and hence all the ramifications can be recorded; and secondly the interviewer is able to probe any points of interest which emerge, and obtain a better appreciation of the factors considered by the interviewee. The point made above concerning apparent stress among interviewees seems, from experience of interviewing, only to apply to quantitative questions, and the interview environment seems more appropriate to obtaining qualitative information.

The combination of questionnaire and interview, however, was useful in that traveller types could be established by questionnaire, together with the multifarious practical details of the journey and household, whilst the causal factors, which are difficult to obtain by questionnaire, could be established by interview. Thus, although there were small sample sizes in the interviews of traveller type, some idea of why people travelled by particular modes could be obtained. When this is compared to the results of the extended questionnaire alone, it can be seen that although an attempt was made to establish causal factors, the amount of information obtained, and particularly the reasons and decisions implicit in mode choice, was not nearly so detailed. (See details of how arrangements arose in the results of interviews section, and compare to Table 5.27 which contains questionnaire answers on how arrangements arose.) The argument lies in whether the time and effort involved in carrying out interviews is justified by the extra detail obtained.

7.2.2. Time and cost involvement

In terms of administration of the two techniques, experience has shown that questionnaires were the easier of the two in this study. The amount of time involvement of both administrator and respondent can generally be said to be less, depending obviously on the arrangements worked out with the survey site employers. In the case of this study, the questionnaires involved the survey staff only in distribution and collection (at NCB concurrent processes, see Section 3.4.4), whereas the interviews needed more time and manpower commitment. An important point here is the amount of disruption caused to the organisation being surveyed. As stated previously, NCB management was very cooperative, but it was made clear to us that , taking into account the various liaison meetings concerning the questionnaire survey, the survey itself, and the involvement in conducting the interviews, there was concern at the time involved.

The following is a breakdown of the costs of each technique. The costs are divided between surveyor and employer as follows:

Surveyor

Fixed costs: Design, typing, liaison, distribution and collection.

Variable costs: Printing and collation, coding, punching, interviewer time.

Employer

Fixed costs: Liaison, distribution and collection.

Variable costs: Completion.

Table 7.1 shows our estimations of the actual fixed costs and variable costs per respondent to both surveyor and employer.

Table 7.2 shows a comparison of these costs relating to all these techniques for a hypothetical survey of 400 questionnaires plus 50 interviews (assuming 100% response).

Respondent completion time is based on 10 minutes per interview and basic questionnaire, and 15 minutes per extended questionnaire.

Employer costs are based on a daily rate of £40.

Typing costs are based on a daily rate of £20.

As can be seen from Table 7.1, the relative costs depend critically on the proportion of questionnaire recipients who are interviewed. Fixed costs are higher for both employer and surveyor with an interview, but variable costs are lower for the surveyor provided that no more than 20% are interviewed, and for the employer provided that less than half are interviewed. In practice interview percentages are likely to be lower than this and, as Table 7.2 shows, with 400 recipients of whom 12½% are interviewed, the cost of the extended questionnaire is substantially higher for the employer, and slightly higher for the surveyor.

These cost comparisons ignore the relative analysis problems of the two methods. While the extended questionnaires were designed for computer analysis, and were thus easy to summarise in tables, the interviews required careful summary and interpretation. However this process itself is useful in identifying characteristics of particular interest.

7.2.3. Summary

On balance it would appear that for the type of survey involved in this study, a shorter questionnaire followed by interviews is preferable, provided that management is willing to incur the additional workload involved.

7.3 Appropriateness of data

7.3.1. Data which might reasonably be excluded

The following items in the questionnaire appear to have had little bearing on the analysis and could reasonably be excluded:

Basic and Extended Questionnaires

i) 1E "How long does it take you to walk from your journey's end to your place of work?".

ii) Section 3 (Basic) and Section 4 (Extended) "Public Transport as an Alternative".

Extended Questionnaire only

i) 1H Details of travel if respondent had moved house within the last 6 months.

ii) 2G Details of the types of vehicles used by car-poolers/sharers in the journey to work.

7.3.2. Data which could usefully be included

The one item which could usefully have been pursued was the distinction between drivers giving lifts to members of their families and drivers giving lifts to others. In view of the apparent importance of family contacts to the establishment of lift giving, we would recommend that this distinction be drawn in identifying types of car use.

7.4 Recommendation for survey design

7.4.1. While surveys of the type reported here are useful in identifying characteristics of existing car sharers, it seems unlikely that they will provide a basis for identifying potential car users. However, they may suggest the incentives necessary for an organised scheme to succeed. Othe survey techniques (Bonsall 1980a) are more appropriate for this.

Table 7.1 Fixed and unit costs of Survey Techniques

	Method 1		Method 2
	Basic Questionnaire + Interview		Extended Questionnaire
Surveyor			
Fixed cost	£620	£250	£850
Unit cost per form	53p	£1.10	76p
Employer			
Fixed cost	£140	£40	£140
Unit cost per form	82p	80p	£1.25

Table 7.2 Comparison of costs for 400 questionnaires and 50 interviews

	Basic Questionnaire		Interview		Extended Questionnaire	
	Surveyor	Employer	Surveyor	Employer	Surveyor	Employer
Production	£	£	£	£	£	£
Design	420 F	-	210 F	-	630 F	-
Typing	60 F	-	20 F	-	80 F	-
Printing/Photocopying	65 V	-	2 V	-	86 V	-
Collating	10 V	-	3 V	-	13 V	-
Implementation						
Liaison	100 F	100 F	20 F	40 F	100 F	100 F
Distribution/Correction	40 F	40 F	-	-	40 F	40 F
Completion	-	330 V	40 V	40 V	-	500 V
Analysis						
Coding	85 V	-	10 V	-	130 V	-
Punching	50 V	-	-	-	75 V	-
Computer (not included)	-	-	-	-	-	-
T O T A L S	830	470	305	80	1154	640

	Basic Questionnaire + Interviews		Extended Questionnaire	
	Surveyor	Employer	Surveyor	Employer
Comparison of total costs of basic questionnaire + interviews as against extended questionnaire	£1135	£550	£1154	£640

F = Fixed cost

V = Variable cost

ACKNOWLEDGEMENTS

The project was sponsored by the Department of Transport, and the assistance of staff of the Traffic Advisory Unit (now LUT 1 division) is gratefully acknowledged. The surveys would not have been possible but for the co-operation of the personnel and union representatives of the organisations concerned. Much of the early analysis of traffic conditions in Sheffield was conducted by Dennis Cummings, and Jo Johnson assisted in the data collection and technical analysis.

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APPENDICES

A. Advance warning letter for NCB

B. Covering letter 'with notes'

C. NCB Questionnaire and comments on same

D. Advance warning letter for MB

E. Covering letter for MB

F. MB Questionnaire and comments on same

G. Interview forms

H. Additional tables

THE UNIVERSITY OF LEEDS

APPENDIX A

Leeds
LS2 9JT
Telephone (0532) 31751

From the Institute for
Transport Studies

Director and Professor
of Transport Engineering: A. D. May

FOM/JD

Professor of
Transport Economics: K. M. Gwilliam

National Coal Board,
Pensions Office,
Sheffield

20th February 1980

Dear Sir or Madam,

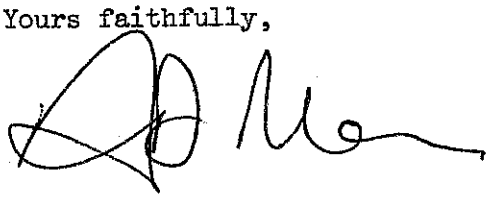
On Wednesday, 27th February, research workers from the Institute for Transport Studies, University of Leeds, will be visiting your offices to carry out a travel survey, the purpose of which is to obtain information on the methods of travel to and from work by city centre office workers.

The survey is being carried out as part of a research contract for the Department of Transport, London, and is in the form of a self-completion questionnaire, copies of which will be distributed on the survey day. The questionnaire has been examined in detail and approved by your employer and your union representatives.

I would like to stress that the completed questionnaires will be collected by members of this Institute, and treated in the strictest confidence. No personal information will be divulged to your employer or anyone else outside the Institute.

Your co-operation in answering the questionnaires will be greatly appreciated.

Yours faithfully,



A. D. May

APPENDIX E

THE UNIVERSITY OF LEEDS

Leeds
LS2 9JT
Telephone (0532) 31751

From the Institute for
Transport Studies

Director and Professor
of Transport Engineering: A. D. May

Professor of
Transport Economics: K. M. Gwilliam

March 1980

Dear Sir or Madam,

The Institute for Transport Studies has been asked by the Department of Transport to carry out an investigaton into the methods of travel to and from work by office workers. In particular, we are interested in the changes which people make in their journey to work when they change their times of starting or finishing work.

To this end, the Midland Bank, A.S.T.M.S and B.I.F.U. have kindly agreed to let us circulate the attached questionnaire.

Not all the questions will apply to you, so that despite its apparent length it should only take a few minutes to complete. We would be grateful if you would complete all those sections which do apply to you, but if there are any questions to which you object strongly, please leave them blank and continue with the others.

It is important that all the questionnaires are completed on the same day, so could we please ask you to make sure that you fill it in on the same day as you receive it? Completed questionnaires should be placed in the collection boxes which have been set up in the entrance foyer of the building.

Before answering any of the questions, may we ask you to read carefully the notes on the front page of the questionnaire?

Your answers will be treated in the strictest confidence, and your co-operation is most appreciated.

Thank you.

Yours faithfully,

A.D. MAY

APPENDIX B (i)

THE UNIVERSITY OF LEEDS

Leeds
LS2 9JT
Telephone (0532) 31751

From the Institute for
Transport Studies

Director and Professor
of Transport Engineering: A. D. May

Professor of
Transport Economics: K. M. Gwilliam

February, 1980

Dear Sir or Madam,

The Institute for Transport Studies has been asked by the Department of Transport to carry out an investigation into the methods of travel to and from work by office workers. In particular, we are interested in the changes which people make in their journey to work when they change their times of starting or finishing work.

To this end, the National Coal Board Pensions Office, after consultation with your union representatives, has kindly agreed to let us circulate the attached questionnaire.

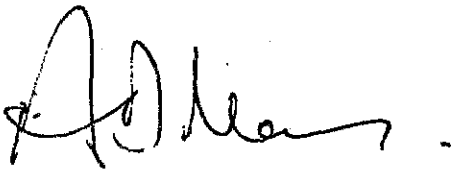
Not all the questions will apply to you, so that despite its apparent length it should only take about 10 minutes to complete. We would be grateful if you would complete all those sections which do apply to you, but if there are any questions to which you object strongly, please leave them blank and continue with the others.

The completed questionnaires will be collected by members of this Institute, and your answers will be treated in the strictest confidence.

Before answering any of the questions, may we ask you to read carefully the notes on the reverse side of this letter.

Your co-operation is most appreciated. Thank you.

Yours faithfully,



A. D. May

Encl.

APPENDIX B(ii)

Notes on completion of questionnaire

1. The questionnaire has been designed so that most questions simply require you to place a tick (✓) in the appropriate box.

2. Where you are asked to give estimates of time spent travelling, please be as accurate as you can remember.

3. In section 4, where we ask for details of members of your household, you should include those persons with whom you live, sharing main meals and common expenses.

APPENDIX C. Basic Questionnaire

General comments on Basic and Extended Questionnaires

1. All questions were subjected to preliminary analysis. The questions not included in the analysis in the report (other than purely 'filter' questions) were found to have low reliability rates due to poor wording, or low applicability to respondents. These questions are marked below (*).

2. Section 2 of the Basic Questionnaire and Section 3 of the Extended Questionnaire (work hour arrangements) were not subjected to detailed analysis.

3. Judging from answers obtained in the follow-up interview, and from comments received when collecting the completed forms, neither questionnaire caused any great antagonism on the part of respondents. The only sections to cause any problems were those concerning household and personal details.

4. It has been found that it is very important to give respondents adequate space on the form for their answers. Occasional comments about this, particularly on the basic version, were written in the margin by respondents.

5. Clear, concise and simple wording in questions is extremely important, as is the avoidance of technical 'jargon'.

6. A statement guaranteeing the confidentiality of responses is important.

7. Unnecessary questions should be left out if there is any doubt about their relevance. Particular thought needs to be given to questions which might affect overall response or require complex coding. To some extent both questionnaires err in this respect.

8. The use of non-white paper for the questionnaire forms is highly recommended, as it makes them stand out from other accumulated desk work.

Section 1. Travel to work

A. Postcode was required to give information on the origin of the trip. Originally this question asked for full home address, but opposition to this came from union representatives as being too intrusive. Postcode was agreed upon and achieved a high response rate (91.3%); however, it must be remembered that this is probably unusual in that Sheffield had recently undergone heavy publicity concerning use of postcodes.

B. The question asks for details of the journey 'yesterday', to ensure that details were completed for one particular day. One fault in this question emerged, namely that short walks were often included, i.e. walks of less than $\frac{1}{4}$ of a mile, and these were not considered to constitute a separate mode. These short walks were given a specific code and excluded from the analysis.

C. This was included at the request of the Dept. of Transport in order to be consistent with the questionnaire used in the Llanishen study.

D.* (2) +(3) These were required to try to establish if there was any relationship in terms of distance between the people travelling together in the car. A problem emerged in the wording of these questions in that 'including yourself' was ignored by some respondents, thus causing a loss of consistency in the responses. Also, question 3 did not have provision for a 'to work' and 'from work' split. These questions were not included in the main analysis because of the unreliability of response.

D. (4) This was included to check whether people arrived at work early to obtain a parking space near their workplace if they were not able to park in the employer's car park.

G.* The question was requested by the Dept. of Transport as in C, and has not been included in the analysis because of a low response rate.

*Section 2. Work hour arrangements

Much of the analysis of this information was in practice conducted in an unrelated project on work journey rescheduling in .Wakefield

A. (1) This question was largely unnecessary as the majority of respondents worked flexible hours. It was included for the benefit of shift workers or others who may have been working fixed hours. It relates to question B as the variation in arrival and departure times over the week is unlikely to be as marked on fixed hours as it would be on flexible hours. It was thus a filter question in terms of analysing the work hours of people working flexible hours.

(2) This was included to check on the possibility that there is a relationship between the length of time flexible work hours have been in operation and the degree to which the freedom the system offers is used.

B. This was required to obtain arrival and departure times of respondents, together with any variation therein over the week. This would be an indication of adaptation of work hours to suit travel or household constraints. It was necessary to ascertain whether times given by respondents were decimal hours or minutes as the clock-in system operated on a decimal system at both survey sites.

C. This was required to give an indication of whether respondents' modes of travel resulted in their arriving at, or departing from, work outside the limits specified by the employer. E.g. at N.C.B. work could not begin before 0800, but some people arrived before that time.

E. (2) In practice this question was not as successful as first hoped, as some respondents ticked every box.

*Section 3. Public transport as an alternative

This section was analysed preliminarily, but was found to have low responses since it did not apply to the majority of respondents, and was not included in the final analysis.

The two filters at the beginning of the section did not adequately limit response to those who had once been regular public transport users. They were amended in the extended questionnaire.

C. No alternatives were pre-printed here as it was thought that the range of reasons could be large. In the coding stages of the analysis it was found that the responses could be coded into mutually exclusive groups.

Section 4. Household constraints on travel

A. This was required to obtain information on the structure and life-cycle classification of the respondent's household, as it was thought that there might be a relationship between this and the facility for car-sharing, but it excluded children under 5.

C. This was included for compatibility with the Department of Transport's surveys.

Section 5. Personal

This section was placed at the end of the questionnaire deliberately so that if any respondents objected to giving personal details, they would not be put off filling in the rest of the questionnaire. It was thought that putting the personal section at the front of the form might jeopardise the chances of having the remainder of the form completed.

B. The ages were banded so that respondents would not have to give an exact figure.

C. Not unexpectedly, it proved to be the most sensitive question of the whole survey. As in B, bands were created to avoid respondents' having to give an exact figure. The response rate to this question was 72%.

D. This was required as it was thought that there is a relationship between telephone ownership and car-sharing.

E. This was required to obtain the names of respondents who would be willing to take part in the follow-up interviews. The response to this question was 30.5%.

APPENDIX C

UNIVERSITY OF LEEDS

INSTITUTE FOR TRANSPORT STUDIES

JOURNEY TO WORK QUESTIONNAIRE

SECTION 1: TRAVEL TO WORK

A. Please state postcode of home address. (i.e. address from which you travel to work daily)

Postcode: _____

B. How did you travel to and from work yesterday? Include in order all methods of travel, e.g. car, bus, train, motorcycle, cycle, walk.

Travel to work

Order	Method	Miles	Mins
1			
2			
3			
4			

Travel from work

Order	Method	Miles	Mins
1			
2			
3			
4			

C. If above are not your USUAL methods of travel, please underline those sections which are abnormal and give details of normal methods below.

To work	From work

D. If part/all of your journey was by car or van please complete as appropriate. If not, please go to Question E.

(1) Were you:

	Going to work	Coming from work
driving alone		
driving with passenger		
passenger with kin		
passenger with somebody else		
sharing expenses		
car pooling		

(2) What was the maximum number of persons in the car during this journey (including yourself)?

How many of these were from your workplace (including yourself)?

(3) Of the people in the car whose workplace is within 5 mins. walk of yours, how many (including yourself) were:

from your household	
near neighbour	
neither	

(4) Where is the car usually parked during the day?

on street
in employer's car park
in public car park

E. How long does it take you to walk from your journey's end to your place of work? (e.g. from car park or bus stop to office)

mins

F. If for any reason your normal method of travel were not available, what other method(s) would you use?

To work	From work

G. If you have altered your method of travel in the last 6 months because of moving house, please give details:

New method	
Previous method	
Previous location (i.e. postcode)	

SECTION 2: WORK HOUR ARRANGEMENTS

A. (1) What are your present work hour arrangements? (Please tick)

Flexible work hours	
Fixed work hours	

(2) How long (if applicable) have you had flexible work hours?

years	months

B. When did you actually arrive at and depart from your office last week? (Cross out days when you were not working). Please state whether decimal hours or minutes.

	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Use if same time all days
arrived							
departed							

C. If you arrive at the office some time before starting work or wait after work for transport home, is this due to?

	to work	from work
Bus/train times		
Giving/receiving a lift		
Other (please specify)		

How long (in minutes) do you arrive before start time?

How long (in minutes) do you wait after work?

D. What effect (if applicable) have flexible hours had on the length of time (in minutes) of your work journey?

	To work	From work
Shortened it by		
Lengthened it by		
No effect (please tick)		

E. 1. Have you changed your pattern of work hours in the past six months?

yes	no

2. If yes, please indicate the type of overall change you have made. If no, please go to Section 3.

Start work earlier	
Start work later	
Longer lunch	
Shorter lunch	
Finish work earlier	
Finish work later	
Other (please specify)	

3. Which of these factors influenced your decision to change your work hours?

Avoiding congestion	
Less crowded public transport	
More convenient bus/train times	
Giving/receiving a lift	

4. Did changing your pattern of work hours (if applicable) cause you to change your method of travel? (e.g. from bus to car passenger).

yes	no

5. If yes, what was your previous method(s)?

to work	from work

SECTION 3: PUBLIC TRANSPORT AS AN ALTERNATIVE

If you are a regular user of public transport, go to Section 4.

If you are NOT NOW a regular user of public transport:

A. How long ago did you stop using it?

B. For how long before that had you been a regular user?

	years	months
A.		
B.		

C. Why did you stop using public transport?

D. Would any of these improvements make you use public transport regularly again?

More frequent services	
More reliable timekeeping	
More comfort	
Better co-ordination of bus/train	
Other (specify)	

SECTION 4: HOUSEHOLD CONSTRAINTS ON TRAVEL

A. Please list all members of your household over 5 years of age, indicating their relationship to you (e.g. husband, wife, son, sister, lodger), and tick those spaces which apply to them.

Relationship to you	If in full-time education	If over 16	If over pension age	If employed	If works at your office building	If holds full car driving licence
Self						

yes	no

B. Do you have the use of a car? (If No go to Section 5)

C. Is it a company owned/run car?

D. How many days per week (give number) do you use this car for your work journey travel?

E. If you leave this car at home will another person in your household use it for work?

F. Is there another car in your household?

yes	no

SECTION 5: PERSONAL

A. Please tick as applicable.

Male	Female

B. Please tick your age group.

under 21	21-30	31-50	over 50

C. Please tick your gross weekly salary (before tax and excluding bonus)

under £50	£50-100	£101-150	over £150

D. Do you have a telephone at home?

yes	no

E. Please give your name if you would be willing to be included in a further survey, again in confidence.

_____

THE UNIVERSITY OF LEEDS

APPENDIX D

Leeds
LS2 9JT
Telephone (0532) 31751

From the Institute for
Transport Studies

Director and Professor
of Transport Engineering: A. D. May

Professor of
Transport Economics: K. M. Gwilliam

12 March 1980

Midland Bank Head Quarters
Griffin House
Sheffield

Attention of all personnel

Dear Sir or Madam,

On Wednesday 19 March, research workers from The Institute for Transport Studies, University of Leeds, will be visiting your office to carry out a travel survey, the purpose of which is to obtain information on the methods of travel to and from work by city centre office workers.

The survey is being carried out as part of a research contract for The Department of Transport, London, and is in the form of a self-completion questionnaire, copies of which will be distributed on the survey day to randomly selected bank personnel.

The questionnaire has been examined in detail and approved by the Midland Bank, A.S.T.M.S and B.I.F.U. The completed questionnaires will be treated in the strictest confidence, and no personal information will be divulged to your employer or anyone else outside the Institute.

Your co-operation in answering the questionnaire will be greatly appreciated.

Yours faithfully,

A.D. MAY

APPENDIX F

UNIVERSITY OF LEEDS

TRAVEL SURVEY

NOTES ON COMPLETION OF THE QUESTIONNAIRE

1. A car-sharing scheme is defined as giving or receiving lifts to and/or from work on a regular basis, (including members of your own household).

   A car-pooling scheme is defined as a regular arrangement between car owners who take turns to drive their own car and give a lift to the other(s).

2. The questionnaire has been designed so that most questions simply require you to place a tick (✓) in the appropriate box.

3. Where you are asked to give estimates of time spent travelling, please be as accurate as you can remember.

4. In Section 5, where we ask for details of members of your household, you should include those persons with whom you live, sharing main meals and common expenses.

SECTION 1: TRAVEL TO WORK

A. What is the address or postcode from which you travel to work daily?

Postcode

B. How did you travel to and from work yesterday? Include in order all methods of travel e.g. car, bus, train, motorcycle, cycle, walk.

Travel to work

Order	Method	Miles	Mins
1			
2			
3			
4			

Travel from work

Order	Method	Miles	Mins
1			
2			
3			
4			

C. If above are not your USUAL methods of travel, please underline those sections which are abnormal and give details of normal methods below.

Travel to work

Order	Method	Miles	Mins
1			
2			
3			

Travel from work

Order	Method	Miles	Mins
1			
2			
3			

D. If part/all of your journey was by car or van please complete as appropriate. If not, please go to Question E.

(1) Were you:
(please tick more than 1 box if necessary)

	Going to work	Coming from work
driving alone		
driving with passenger		
passenger with kin		
passenger with somebody else		
sharing expenses		
car pooling		

(2) What was the maximum number of persons in the car during this journey (including yourself)?

How many of these were from your workplace (including yourself)?

(3) Of the people in the car whose workplace is within 5 mins. walk of yours, how many (including yourself) were:

from your household:		
near neighbour		
neither		

(4) Where is the car usually parked during the day?

on street	
in employer's car park	
in public car park	

(5) What do you pay for parking per day?

	pence

E. How long does it take you to walk from your journey's end to your place of work? (E.g. from car park or bus stop to office)

	mins

F. What is, or would be, your daily bus/train fare?

£.	p.

G. If for any reason your normal method(s) of travel were not available, what other method(s) would you use?

To work	From work

H. If you have altered your method(s) of travel in the last 6 months because of moving house, please give details:

New method(s)	
Previous method(s)	
Previous location (street, town/area or postcode)	

I. Are you involved in <u>either</u> a car sharing or a car pooling scheme as a <u>regular participant</u>? (see note 1).
If yes, please complete section 2.
If no, please go to section 3.

Yes	
No	

SECTION 2: CAR POOLING/SHARING

A. Please give your reasons for forming the arrangement (tick more than 1 box if necessary)

other use for family car	
social	
convenience	
reduce travel costs	
family ties	
other (please specify)	

B. How did your present arrangement arise? (tick more than 1 box if necessary)

notice board at work	
other publicity at work	
arranged with home-based friends	
arranged with work-based friends	
arranged with relatives	
other (please specify	

C. Which of the following factors, if any, were important in forming that arrangement? (tick more than 1 box if necessary)

start/finish work time	
amount of route diversion	
personal characteristics (e.g. smoker/non smoker)	
other (please specify)	

D. How long has your arrangement been in operation?

	months

E. How many days per week is the arrangement in operation?

	days

F. How did you travel immediately before this arrangement came into operation? (If applicable please include in order all methods, e.g. bus, train, walk).

1.
2.
3.
4.

G. Please give details of the vehicle(s) in which you travel.

Make	Model	Engine size	No. of seats	Yr. of manuf.	Is it serviced by yourself/ garage/other	Is it company/ or privately owned	Are running costs paid by co. or yourself

H. Which of the following applies to you?

1. Always drive and take passengers	
2. Always a passenger	
3. Alternate driving (i.e. pool cars)	

I. If you answered (1) or (3) in Qu.H - When you are driving how do you rendezvous with your passengers?

You pick them up from/near home	
They travel to a collecting point	
Other (specify)	

J. When you are driving, how much is your journey lengthened by picking up passengers? (Assuming you would otherwise travel by car along the most direct route)

	miles
	mins

K. If you answered (2) or (3) in Qu.H - When you are not driving, how do you rendezvous with the driver?

Picks you up from/near home	
You travel to a collecting point	
Other (specify)	

L. If you answered (1) or (2) in Qu.H - What type of compensation do you give to the driver/receive from the passengers?

Regular money	
Periodic gifts	
Other (specify)	
None	

M. If compensation is received/given, please state the weekly amount per person, and indicate how this amount is calculated.

Calculation	Amount		
	Person 1.	Person 2.	Person 3.
based on weekly petrol cost			
based on weekly petrol cost and some overheads			
equivalent to weekly bus fare			
other (specify)			

N. If you have taken part previously in any car sharing/pooling schemes at or near your present workplace, please give details.

	Duration	No. of participants (incl. yourself)	Reasons for withdrawal/ break up	Residence Location
Sharing				
Pooling				

SECTION 3: WORK HOUR ARRANGEMENT

A. (1) What are your present work hour arrangements?

flexible work hours	
fixed work hours	

(2) How long (if applicable) have you had flexible work hours?

years	months

B. When did you actually start and finish work last week? (Cross out days when you were not working). Please state whether decimal hours or minutes.

	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	use if same time all days
start time							
finish time							

C. Which of these factors, if any, is important in choosing your hours of starting and finishing work.
(tick more than 1 box if necessary).

More time at home	
Time for personal business	
Match times of work to life style	
Co-ordinating sharing/pooling	
Receiving lifts	
Public transport times	

D. If you arrive at the office some time before starting work or wait after work for transport home, is this due to?

	to work	from work
Bus/train times		
Giving/receiving a lift		
Other (please specify)		

How long (in minutes) do you arrive before start time?

How long (in minutes) do you wait after work?

E. What effect (if applicable) have flexible hours had on the length of time of your own work journey?

	to work	from work
Shortened it by (mins)		
Lengthened it by (mins)		
No effect (please tick)		

F. 1. Have you changed your pattern of work hours in the past six months?

yes	no

2. If yes, please indicate the type of overall change(s) you have made. If no, please go to Section 3.

Start work earlier	
Start work later	
Longer lunch	
Shorter lunch	
Finish work earlier	
Finish work later	
Other (please specify)	

3. Which of these factors, if any, influenced your decision to change your work hours?

Avoiding congestion	
Less crowded public transport	
More convenient bus/train times	
Giving/receiving a lift	
Other (specify)	

4. Did changing your pattern of work hours (if applicable) cause you to change your method(s) of travel? (e.g. from bus to car passenger).

Yes
No

5. If yes, what was your previous method(s)

To work	From work

SECTION 4: PUBLIC TRANSPORT AS AN ALTERNATIVE

Are you presently a regular user of public transport? If yes go to Section 5.

Yes	No

Have you ever been a regular user of public transport? If no, go to Section 5.

A. How long ago did you stop using public transport?

years	months

B. For how long before that had you been a regular user?

years	months

C. Why did you stop using public transport?

D. Would any of these improvements make you use public transport regularly again? (please tick more than 1 box if necessary)

More frequent services	
More reliable timekeeping	
More comfort	
Better co-ordination of bus and car	
Other (specify)	

SECTION 5: HOUSEHOLD CONSTRAINTS ON TRAVEL

A. Please list all members of your household over 5 years of age, indicating their relationship to you (e.g. husband, wife, son, sister, lodger), and tick those spaces which apply.

Relationship to you	If in full-time education	If over 16	If over pension age	If employed	If works at your office building	If holds full car driving licence
Self						

B. Are there any children aged 5 or under in your household? (Please give number or NONE)

C. Do any of the following influence the time you leave home for work?

Pre-school children	
Children at school	
Invalids/elderly relatives	
Other (please specify)	

Yes	No

D. Do you have the use of a car? (If no go to Section 6)

E. Is it a company owned car?

If not, does the company contribute substantially to its upkeep?

F. How many days per week (give number) do you use this car for your journey to work?

Yes	No

G. If you leave this car at home will another person in your household use it for work?

H. Is there another car in your household?

SECTION 6: PERSONAL

A. Please tick as applicable

Male	Female

B. Please tick your age group

Under 21	21-30	31-50	Over 50

C. Please tick your gross annual salary (before tax)

Over £2500	£2500-£5000	£5001-£7500	Over £7500

D. Do you have a telephone at home?

Yes	No

E. Please print your name if you are willing to be included in a further survey, again in confidence.

_____

APPENDIX F

Extended questionnaire: notes on individual questions.

The extended questionnaire is an expanded, and slightly modified, version of the basic questionnaire and comments in Appendix C are therefore relevant to those questions common to both forms. However, there are some extra questions in the extended version, and these are discussed below.

Section 1. Travel to work

C. (1C in basic Qn) This question's layout was restyled so that information given would be in the same format as that given in 1B.

D.5 & F (Additions) These were included to obtain information on travel costs over and above running costs. Responses to F from car users appeared to be unreliable.

G&H. (F & G in basic Qn) The layout was altered to provide more room for the respondent to answer.

I. This was included as a filter question for section 2.

Section 2. Car pooling/sharing

The whole of this section was an addition to the basic questionnaire and was included to provide information about existing car pooling/sharing arrangements.

*G. This was requested by the Dept. of Transport to produce compatibility with the Longbenton and Llanishen surveys. It was not inlcuded in our final analysis, but may form part of further analyses to be carried out by D.Tp.

I,J, K*, L*,M These were required to obtain practical details of the arrangement. The questions relating to compensation proved not applicable to the majority of sharers/poolers and so were not included in the final analysis.

N*. This was required to ascertain whether the respondent had been a member of a pooling/sharing scheme previously, and if so to obtain details. Again, this question was only applicable to a small number of respondents.

*Section 3. Work hour arrangement

C. (Addition to basic Qn) This was required to find out on what basis, if any, the choice of work hours was made.

F.5 (E.5 in basic Qn) The layout of this question was changed to provide the respondent with more answer space.

*Section 4. Public transport as an alternative

The filter questions at the beginning of the section were amended to cover all eventualities, and to ensure that only respondents who had been regular public transport users, and had for some reason stopped, answered the section.

Section 5. Household constraints on travel

*B. (Addition to basic Qn) This was included as children under 5 years old are likely to be a constraint on travel times.

*C. (Addition to basic Qn) This was required to give a more comprehensive picture of what the respondent considered to be a constraint within the household.

E. (C in basic Qn) This was enlarged to include company's contribution to upkeep of the car. It was required to distinguish further between privately owned and run cars and those owned and run by the company. In the specific case of Midland Bank, it produced little extra information.

Section 6. Personal

C. (Alteration to basic Qn) The salary bands were changed to annual amounts on the advice of the Head of Administration on the survey site. This was because it was thought that respondents would be more familiar with their annual salary figures than with weekly or monthly ones.

E. (Alteration to basic Qn) This was changed from 'please give' to 'please print' as some names given in the basic questionnaire were virtually indecipherable. The response rate was 47.4%. In practice these offers were not followed up.

APPENDIX G

Name: _____ Ref no: _____

SHARING EXPENSES

1. Check that mode filled in at time of survey is still used. If not, ask what new mode is and why stopped using old mode.

   New mode _____ Reasons for stopping _____

2. Do you drive or are you a passenger?

   Drive Passenger

3. How do you rendezvous with your driver/passenger

   Their home Collecting point Your home

4. How much is your journey lengthened by meeting your driver/passenger

   Miles _____ Minutes _____

5a. Type of compensation given/received

   Money Gifts None

5b. Petrol cost Petrol and overheads Bus fare

6. Reasons for forming arrangement

   Social Convenience Cost Family

7. How arrangement arose

   Notice board Other publicity at work Home friends Work friends Relatives

8. What taken into consideration when forming arrangement

   Work times Route diversion Smoker

9. How long has arrangement been in operation?

   _____

10. How many days per week is the arrangement in operation?

   _____

11. How did you travel before the arrangement?

   _____

12. Any previous sharing arrangements at or near workplace

   Duration No. of participants Reasons for withdrawal/break-up

   _____ _____ _____

   Residence/work location

   R _____

   W _____

13. Vehicle details

   make model c.c. No. of seats Year of manufacture

   _____ _____ _____ _____ _____

   Servicing Co. owned? Who pays costs

   _____ _____ _____

14. Parking cost per day of driver _____

15. Return bus/train fare _____

16. Is weekly work pattern regular (refer to questionnaire)

    Yes No

    Reasons _____

17. Influences on time of leaving home for work

    Pre-school children Children at school Invalids Old people

18. If arrive before starting work or wait until after finishing

    Reasons _____

19. If rescheduled work day in last 6 months (i.e. shorter lunch etc.)

    Reasons _____

20. Problems in completing questionnaire

    _____

    _____

    _____

    _____

COMMENTS:

Name: _____ Ref no: _____

DRIVER GIVING LIFT

1. Check that mode filled in at time of survey is still used. If not, ask what new mode is and why stopped using old mode:

   New mode _____ Reasons for stopping _____

2. How rendezvous with passenger(s)?

   Their home Collecting point Your home

3. How much is your journey lengthened by meeting your passengers? Miles _____ Mins. _____

4a. Type of compensation received

   Money Gifts None

4b. Amount of compensation and how calculated for each passenger

   Petrol cost Petrol and overheads Bus fare

5. Reasons for forming arrangement

   Social Convenience Cost Family

6. How arrangement arose

   Notice board Other publicity at work Home friends Work friends Relatives

7. What taken into consideration when forming arrangement?

   Work times Route diversion Smoker

8. How long arrangement has been in operation

   _____

9. How many days per week arrangement is in operation

   _____

10. How did you travel before the arrangement?

    _____

11. Any previous sharing arrangements at or near workplace

    Duration _____ No. of participants _____ Reasons for withdrawal/break-up _____

    Residence/work location

    R _____

    W _____

12. Vehicle details

    make _____ model _____ c.c. _____ No. of seats _____ Year of manufacture _____

    Servicing _____ Co. owned? _____ Who pays costs? _____

13. Parking cost per day _____

14. Return bus/train fare _____

15. Is weekly work pattern regular (refer to questionnaire)

    Yes No

    Reasons _____

16. Influences on time of leaving home for work

    Pre-school children Children at school Invalids Old people

17. If arrive before starting work or wait until after finishing.

    Reasons _____

18. If rescheduled work day in last 6 months (i.e. shorter lunch etc.)

    Reasons _____

19. Problems in completing questionnaire

    _____

    _____

    _____

    _____

COMMENTS:

Name: _____ Ref no: _____

PASSENGERS RECEIVING LIFT) With kin
) With somebody else

1. Check that mode filled in at time of survey is still used. If not, ask what new mode is and why stopped using old mode.

   New mode: _____ Reasons for stopping: _____

2. How do you rendezvous with your driver?

   Their home Collecting point Your home

3. How much is your journey lengthened by meeting your driver?

   Miles _____ Minutes _____

4a. Type of compensation given

   Money Gifts None

4b. Amount of compensation and how calculated

   Petrol cost Petrol and overheads Bus fare

5. Reasons for forming arrangement

   Social Convenience Cost Family

6. How arrangement arose

   Notice board Other publicity at work Home friends Work friends Relatives

7. What taken into consideration when forming arrangement

   Work times Route diversion Smoker

8. How long has arrangement been in operation?

   _____

9. How many days per week is the arrangement in operation?

   _____

10. How did you travel before the arrangement?

   _____

11. Any previous sharing arrangements at or near workplace

   Duration _____ No. of participants _____ Reasons for withdrawal/break-up _____

   Residence/work location

   R _____

   W _____

12. Vehicle details

make	model	c.c.	No. of seats	Year of manufacture

Servicing	Co. owned?	Who pays costs?

13. Parking cost per day of driver

_____

14. Return bus/train fare

_____

15. Is weekly work pattern regular (refer to questionnaire)

Yes No

Reasons _____

16. Influences on time of leaving home for work

Pre-school children	Children at school	Invalids	Old people

17. If arrive before starting work or wait until after finishing

Reasons _____

18. If rescheduled work day in last 6 months (i.e. shorter lunch etc.)

Reasons _____

19. Problems in completing questionnaire

_____

_____

_____

_____

COMMENTS:

Name: _____ Ref No: _____

DRIVER ALONE

1. Check that mode filled in at time of survey is still used. If not ask what new mode is and why stopped using old mode.

   New mode: _____ Reasons for stopping: _____

2. Any previous sharing arrangements at or near workplace

   Duration _____ No. of participants _____ Reasons for withdrawal/break-up _____

   Residence/work location

   R _____

   W _____

3. Vehicle details

   make _____ model _____ c.c. _____ No. of seats _____ Year of manufacture _____

   Servicing _____ Co. owned? _____ Who pays costs? _____

4. Parking cost per day _____

5. Return bus/train fare _____

6. Is weekly work pattern regular (refer to questionnaire)

   Yes No

   Reasons _____

7. Influences on time of leaving home for work

   Pre-school children Children at school Invalids Old people

8. If arrive before starting work or wait until after finishing

   Reasons _____

9. If rescheduled work day in last 6 months (i.e. shorter lunch etc.)

   Reasons _____

P.T.O.

10. Problems in completing questionnaire

_____

_____

_____

_____

COMMENTS:

Name: _____ Ref no: _____

PUBLIC TRANSPORT

1. Check that mode filled in at time of survey is still used. If not, ask what new mode is and why stopped using old mode.

   New mode: _____ Reasons for stopping: _____

2. Any previous sharing arrangements at or near workplace:

   Duration _____ No. of participants _____ Reasons for withdrawal/break-up _____

   Residence/work location

   R _____

   W _____

3. Return bus/train fare _____

4. Is weekly work pattern regular (refer to questionnaire)

   Yes No

   Reasons _____

5. Influences on time of leaving home for work.

   Pre-school children Children at school Invalids Old people

6. If arrive before starting work, or wait after finishing.

   Reasons _____

7. If rescheduled work day in last 6 months (i.e. shorter lunch etc.)

   Reasons _____

8. Problems in completing questionnaire:

   _____

   _____

   _____

   _____

COMMENTS:

APPENDIX H Additional Tables

Table H.1 Comparison of the main mode of transport to/from work by sex

	NCB to/from		MB to/from	
	Male	Female	Male	Female
Single mode trips				
Car	20/19	67/55	91/94	31/38
Walk	1/1	0/0	2/1	0/0
Bus	25/23	119/130	39/38	43/35
Train	0/0	1/1	0/0	0/0
Other	0/0	0/1	0/1	0/0
Total	46/43	187/187	132/134	74/73
Main mode of mixed mode trips				
Car	6/5	11/8	6/7	11/5
Walk	0/0	2/2	0/0	0/0
Bus	7/8	57/53	13/12	15/21
Train	7/6	7/5	7/5	0/0
Other	0/0	0/0	0/0	0/0
Total	20/19	77/68	26/24	26/26
Main mode of all trips				
Car	26/24	78/63	97/101	42/43
Walk	1/1	2/2	2/1	0/0
Bus	32/31	176/183	52/50	58/56
Train	7/6	8/6	7/5	0/0
Other	0/0	0/1	0/1	0/0
Total	66/62	264/255	158/158	100/99
Not answered	27/40		14/15	

Table H.2 Comparison of the main mode of transport to/from work by salary range

	NCB salary range to/from				MB salary range to/from			
	<2500	2500-5000	5001-7500	>7500	<2500	2500-5000	5001-7500	>7500
Single mode trips								
Car	5/7	56/43	7/6	6/6	3/3	31/36	21/27	59/59
Walk	0/0	1/1	0/0	0/0	0/0	0/0	1/0	0/0
Bus	21/20	101/110	6/6	1/1	6/5	37/31	23/19	11/12
Train	0/0	1/1	0/0	0/0	0/0	0/0	0/0	0/0
Other	0/0	1/1	0/0	0/0	0/0	0/0	0/1	0/0
Main mode of mixed mode trips								
Car	3/2	9/8	3/1	0/0	0/0	8/6	6/3	1/3
Walk	1/1	2/2	0/0	0/0	0/0	0/0	0/0	0/0
Bus	7/6	44/43	1/2	0/0	1/2	9/11	8/9	4/4
Train	3/4	10/6	0/0	0/0	0/0	0/0	2/2	5/3
Other	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Single and mixed modes								
Car	8/9	65/51	10/7	6/6	3/3	39/42	27/30	60/61
Walk	1/1	3/3	0/0	0/0	0/0	0/0	1/0	0/0
Bus	28/26	145/153	7/8	1/1	7/7	46/42	31/28	15/16
Train	3/4	11/7	0/0	0/0	0/0	0/0	2/2	5/3
Other	0/0	1/1	0/0	0/0	0/0	0/0	0/1	0/0
Total	40/40	225/215	17/15	7/7	10/10	85/84	61/61	80/80
Not answered		72/80				36/37		

Table H.3 Main mode of transport to/from work used by full licence holders and by non-licence holders

	NCB: to/from						
	Car	Walk	Bus	Train	Other	Total	Not answered
Full licence holders	64/53	1/1	55/59	4/4		124/117	91/99
No driving licence	24/17	2/2	109/116	7/5	/1	142/141	

	MB: to/from						
	Car	Walk	Bus	Train	Other	Total	Not answered
Full licence holders	111/115	1/	67/65	5/3	/1	184/184	40/40
No driving licence	15/18	1/1	31/28	1/1		48/48	

Table H.4(a) NCB: Main mode of transport to work by household type of respondents (children under 5 excluded from households)

	Living alone	Self + OAP	Self + Adult	Self + Adult + OAP	Self + Child	Self + Child + OAP	Self + Child + Adult	Self + Child + Adult + OAP	All households
Single mode									
Car	1	2	61	3	1	-	14	-	82
Walk	-	-	1	-	-	-	-	-	1
Bus	5	5	79	3	1	1	33	1	128
Train	-	-	1	-	-	-	-	-	1
Not applicable	-	1	4	-	-	-	1	-	6
Total	6	8	146	6	2	1	48	1	218
Main mode of mixed mode									
Car	-	-	12	-	-	-	4	-	16
Walk	-	-	2	-	1	-	-	-	3
Bus	3	1	42	-	-	-	14	-	60
Train	-	-	9	-	-	-	4	-	13
Not applicable	1	-	1	-	-	-	2	-	4
Not ascertained	-	-	1	-	-	-	-	-	1
Total	4	1	67	-	1	-	24	-	97
Single and mixed modes									
Car	1	2	73	3	1	-	18	-	98
Walk	-	-	3	-	1	-	-	-	4
Bus	8	6	121	3	1	1	47	1	188
Train	-	-	10	-	-	-	4	-	14
Not applicable	1	1	5	-	-	-	3	-	10
Not ascertained	-	-	1	-	-	-	-	-	1
Total	10	9	213	6	3	1	72	1	315

Table H.4(b) MB: Main mode of transport to work by household type of respondents (children under 5 excluded from households)

	Living alone	Self + OAP	Self + Adult	Self + Adult + OAP	Self + Child	Self + Child + OAP	Self + Child + Adult	Self + Child + Adult + OAP	All households
Single mode									
Car	8	2	65	5	-	-	32	1	113
Walk	1	-	-	-	-	-	1	-	2
Bus	8	-	52	2	-	1	13	-	76
Train	-	-	-	-	-	-	-	-	-
Not applicable	-	-	3	-	-	-	4	-	7
Total	17	2	120	7	-	1	50	1	198
Main mode of mixed mode									
Car	3	-	10	-	-	-	1	-	14
Walk	-	-	-	-	-	-	-	-	-
Bus	1	1	19	1	-	-	3	-	25
Train	1	-	2	-	-	-	4	-	7
Not applicable	1	-	1	-	-	-	3	-	5
Total	6	1	32	1	-	-	11	-	51
Single and mixed modes									
Car	11	2	75	5	-	-	33	1	127
Walk	1	-	-	-	-	-	1	-	2
Bus	9	1	71	3	-	1	16	-	101
Train	1	-	2	-	-	-	4	-	7
Not applicable	1	-	4	-	-	-	7	-	12
Total	23	3	152	8	-	1	61	1	249

Table H.5 Type of car/van travel to/from work by salary range

	NCB salary range to/from				MB salary range to/from			
	<2500	2500-5000	5001-7500	>7500	<2500	2500-5000	5001-7500	>7500
Single mode trips								
Driver alone	1/1	13/13	3/3	3/3	1/1	8/10	12/11	31/30
Driver with passenger	0/0	2/3	0/1	1/1	0/0	4/2	9/9	9/6
Passenger with kin	4/5	29/18	3/4	2/2	2/1	16/18	1/3	8/10
Passenger with somebody	0/1	12/8	1/1	0/0	0/1	2/6	0/4	5/8
Car pooling	0/0	0/0	0/0	0/0	0/0	1/0	0/0	5/5
Total	5/7	56/42	7/9	6/6	3/3	31/36	22/27	58/59
Mixed mode trips								
Driver alone	2/1	3/4	1/1	0/0	0/0	3/3	2/2	0/1
Driver with passenger	0/0	1/1	1/0	0/0	0/0	0/0	0/1	2/2
Passenger with kin	1/1	8/3	0/0	0/0	0/0	5/3	4/1	1/1
Passenger with somebody	1/0	3/2	1/0	0/0	0/0	0/0	3/0	0/1
Car pooling	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1
Total	4/2	15/10	3/1	0/0	0/0	8/6	9/4	4/6
Single and mixed mode trips								
Driver alone	3/2	16/17	4/4	3/3	1/1	11/13	14/13	31/31
Driver with passenger	0/0	3/4	1/1	1/1	0/0	4/2	9/10	11/8
Passenger with kin	5/6	37/21	3/4	2/2	2/1	21/21	5/4	9/11
Passenger with somebody	1/1	15/10	2/1	0/0	0/1	2/6	3/4	5/9
Car pooling	0/0	0/0	0/0	0/0	0/0	1/0	0/0	6/6
Total	9/9	71/52	10/10	6/6	3/3	39/42	31/31	62/65

See footnotes to Table 5.14.

Table H.6(a) NCB: Type of car/van travel to work by household type of respondents (children under 5 excluded from households)

	Living alone	Self + OAP	Self + Adult	Self + Adult + OAP	Self + Child	Self + Child + Adult	Self + Child + Adult + OAP	All households
Single mode								
Driver alone	-	1	14	2	-	3	-	20
Driver with a passenger	-	1	3	-	-	2	-	6
Passenger with kin	-	-	35	1	-	8	-	44
Passenger with somebody else	1	-	11	-	1	-	-	13
Car pooling	-	-	-	-	-	-	-	-
Total	1	2	63	3	1	13	-	83
All mixed mode trips *								
Driver alone	-	-	4	-	-	2	-	6
Driver with a passenger	-	-	2	-	-	-	-	2
Passenger with kin	-	-	10	-	-	1	-	11
Passenger with somebody else	-	-	3	-	-	2	-	5
Car pooling	-	-	-	-	-	-	-	-
Total	-	-	19	-	-	5	-	24
Single and mixed mode trips								
Driver alone	-	1	18	2	-	5	-	26
Driver with passenger	-	1	5	-	-	2	-	8
Passenger with kin	-	-	45	1	-	9	-	55
Passenger with somebody else	1	-	14	-	1	2	-	18
Car pooling	-	-	-	-	-	-	-	-
Total	1	2	82	3	1	18	-	107

*Figures in Tables H.6(a) and H.6(b) include data for minor, as well as main mode, of mixed mode trips.

Table H.6(b) Type of car/van travel to work by household type of respondents (children under 5 excluded from households)

	Living alone	Self + OAP	Self + Adult	Self + Adult + OAP	Self + Child	Self + Child + Adult	Self + Child + Adult + OAP	All households
Single mode								
Driver alone	5	2	26	3	-	15	-	51
Driver with passenger	2	-	13	1	-	3	1	20
Passenger with kin	1	-	18	1	-	6	-	26
Passenger with somebody else	1	-	4	-	-	2	-	7
Car pooling *	-	-	4	-	-	5	-	9
Total	9	2	65	5	-	31	1	113
All mixed mode trips								
Driver alone	2	-	-	-	-	1	-	3
Driver with passenger	-	-	2	-	-	1	-	3
Passenger with kin	-	-	9	-	-	1	-	10
Passenger with somebody else	1	-	2	-	-	-	-	3
Car pooling	-	-	-	-	-	1	-	1
Total	3	-	13	-	-	4	-	20
Single and mixed mode trips								
Driver alone	7	2	26	3	-	16	-	54
Driver with passenger	2	-	15	1	-	4	1	23
Passenger with kin	1	-	27	1	-	7	-	36
Passenger with somebody else	2	-	6	-	-	2	-	10
Car pooling	-	-	4	-	-	6	-	10
Total	12	2	78	5	-	35	1	133

* Car pooling includes: driver with passenger/pooling, passenger with kin/pooling; passenger with somebody else/pooling; passenger with kin/somebody else/pooling.