

A CASE STUDY OF THE DEVELOPMENT OF CAR DEPENDENCE IN TEENAGERS

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1. INTRODUCTION

Substantial resource and research effort is being directed towards encouraging and developing a more sustainable transport system and understanding and influencing the choice between the use of the private car and other forms of transport. In general the objective is implicitly to influence the mode choice decisions of existing, established car users. The work detailed in this paper stems from the premise that attempts to influence such established behaviour, particularly once an individual has purchased a private car, will yield limited returns. Car dependence shapes many adults' present lifestyles to the point of being, or at least appearing, irrevocable.

"At the time of first purchase, the car may be seen as a luxury. However, once bought, it encourages changes in behaviour and circumstances which in effect turn it into a necessity. Car dependence grows, rather than simple existing."

(Goodwin et al, 1995)

The growth of car dependence begins even before the point of car purchase with many people of all ages dependent as car passengers. Ownership serves to reinforce and promote dependence. By considering the travel behaviour of young people up to the age of seventeen there is the potential to gain a better understanding of the formative factors that influence and shape young people's longer term travel behaviour and car dependence. It may subsequently be possible to develop policies and practices that aim to instil car independent travel behaviour at an impressionable age that could then serve to resist the drift into car dependence beyond the landmark of the driving test.

This paper reports on a survey of young people's travel behaviour, opinions and aspirations conducted at two secondary schools. A questionnaire was distributed to some 1000 pupils aged between 11 and 17 at a suburban comprehensive school and a rural private school.

2. TEENAGE TRAVEL

Young children have few independent travel needs but nonetheless undertake a considerable amount of travel often as car passengers. Research in Australia found that less than 10 per cent of all trips made by children of primary school age were made independently, compared to 25 per cent of trips made by children older than primary school age (cited in Morris et al, 1996). Teenagers under the legal driving age of seventeen choosing to travel to locations by car must rely upon older people to drive them. Their choices for independent travel are restricted to public transport, cycling and walking. Trips made by car will inevitably be with parents or older

friends and these people must have an influence on their attitudes towards modal choice. The most regular trip for young people is the journey to (and from) school and this has been the predominant focus of research to date concerning young people's travel behaviour.

The proportion of 7 and 8 year-olds allowed to travel to school independently fell from 80 per cent in 1971 to fewer than 10 per cent in 1990 (Sustrans, 1996). The proportion of children aged 5-15 in Great Britain travelling to school by car has increased from 12 per cent in 1975/76 to 27 per cent in 1994/96 (DETR, 1997a).

Bradshaw (1995) identified a whole range of factors as to why children (aged 9-13) are increasingly being driven to school by their parents. The rise in car ownership, particularly the increase in two car households, has been recognised as a major factor. This has served to enable parents to address their concerns over road safety and personal safety by replacing walking and cycling journeys by car. Figure 1 shows that between 1970 and 1994, the increase in the proportion of 2 car households is closely matched with the decrease in the proportion of households with no car.

Primary school children are more likely to be accompanied to school than those at secondary school. Hillman et al. (1993) identified four significant reasons for parental restriction on allowing primary school children to travel to or from school alone. These were traffic danger, child unreliability, fear of molestation and distance. Children who have been taken to school by car from a younger age, due to parental concerns, will have become used to travelling this way. At an older age, when parental concerns over safety are likely to be lower, such children may be in a stronger position to pressure their parents into continued transport provision.

Approximately one child in five qualifies to receive transport at its local authority's expense and some 95 per cent of these children travel by bus (Pettitt et al, 1995). However, legislation allowing parents freedom of choice as to which schools they send their children will have resulted in increased school journey lengths for many children whose parents have elected to send them to schools that fall outside the traditional catchment areas. This is likely to further promote car journeys to school. Under the 1944 Education Act, all pupils within the age range 8-16 living further than 3 miles from the school, for the catchment area in which they fall, are entitled to free transport (Ketteridge, 1997). However, if parents do not choose this school then the entitlement is lost as is the financial incentive to use public transport for the school journey.

A substantial proportion of adults rely heavily on their cars for work and increasingly children are being taken to school as part of their parents' journey to work. The rise in more flexible working hours has facilitated this trend. A number of concerns arise about the shift in mode choice for the journey to school:

- child health – a journey to school by cycle or walking contributes to health and wellbeing
- child safety – a journey to school by car is perceived by parents to be safer and yet ironically as such journeys increase as a consequence so traffic arriving at and around schools is increased leading to increased traffic dangers

- congestion – a significant proportion of peak period traffic is school-related with one source estimating that twenty per cent of peak-hour journeys now consist of school escort journeys (Sustrans, 1996)

Concern has led to initiatives to curb the proportion of car dependent school trips. 'Safe Routes to School', an initiative launched by Sustrans, seeks to offer parents and children viable alternatives to the car for the journey to school by developing safer routes for cyclists and pedestrians. Central and local government are now beginning to attune to such aims and the latest Transport Policies and Programme (TPP) guidance invites measures to encourage walking and cycling in an effort to reduce car dependence. The Royal Commission Report on Environmental Pollution (1994) referred to the importance of developing environmentally desirable lifestyles at an early age. Efforts to redress the balance of mode split for the journey to school are clearly one means of addressing this issue.

Other published research concerning young people's travel behaviour appears to have been limited in the context of car dependence, particularly for those of secondary school age upwards. Solomon and Atkins (1995) noted in a study of teenage travel by public transport in London that "teenage travel has not received much attention from transport researchers and analysts". One of that study's conclusions was that by the age of 14 most teenagers are allowed to travel independently on the buses and Underground however the incentive to use public transport is diminished after 16 because fare concessions are removed. This change occurs at a time when most teenagers are still at school or unemployed and also coincides rather unfortunately with the age at which they can begin to learn to drive. A Student Pass scheme in the Netherlands for students aged between 18 and 27 covered over 90 per cent of the country's full time student population. Conditions of the Pass were varied during successive stages of the scheme but 'purchase' of the Pass offered free travel anywhere in the country, by all forms public transport. The impacts of the scheme amounted to a substantial increase in public transport usage and mode share at the expense of cycle use and to a lesser extent car use (Cheung et al, 1996). Such initiatives are a positive step towards the aim of instilling car independent behaviour in young people although more needs to be understood about the underlying factors that govern young people's travel behaviour in the short and long term.

3. STUDY DETAILS

This study was based on pupils at two secondary schools in a target age range of 11-17. The first school is a large comprehensive (approximately 900 pupils) in suburban Bristol, the Sir Bernard Lovell School (SBL). The school is situated about 8 miles east of the centre of Bristol and less than 10 miles from the centre of Bath. The second school is a smaller private school in rural Wiltshire, Dauntsey's School (with approximately 600 pupils). The school is located 4 miles from the town of Devizes. For both schools there are limited public transport bus services between the school and the surrounding areas with scheduled times that are not well suited to morning registration. However, privately operated chartered school buses also serve the surrounding areas.

A questionnaire survey was designed to collect information concerning the following issues: the journey to school; leisure travel; household characteristics; and learning to drive.

1000 questionnaires were circulated between the two schools: 600 to SBL and 400 to Dauntsey's. Staff at each school had agreed to distribute the questionnaires and collect and return the responses. Class time was set aside for children from SBL to complete their questionnaires. Although this was not the case at Dauntsey's it is assumed that in a substantial proportion of cases the pupils have completed the questionnaires without the help of their parents. Some of the results may be influenced by the extent to which the young respondents are able to recall distances, times and other factual information accurately.

A total of 479 acceptable responses were received. The 326 from SBL represented a 54 per cent response rate and 36 per cent of all pupils. The 153 from Dauntsey's represented a 38 per cent response rate and 25 per cent of all pupils. Responses were received from students in Years 7 (age 11-12) to 12 (age 16-17). Responses from both schools were received for Years 9-11 however only SBL provided responses for Years 7 and 8 meanwhile Year 12 responses were from Dauntsey's only. 54 per cent of the respondents were female. 15 per cent of the responses from Dauntsey's were from boarders.

4. STUDY RESULTS

4.1 The Journey To School

mode	SBL			Dauntsey's		
	mode split (%)	mean distance (km)	mean journey time (minutes)	mode split (%)	mean distance (km)	mean journey time (minutes)
walk	68	1.3	14	7	1.0	9
cycle	4	2.3	12	2	12.9	25
car	16	3.9	11	27	15.6	17
bus	2	8.2	41	2	13.7	23
school bus	10	5.8	14	63	25.7	30

Table 1. Travel mode to school

Table 1 shows the mode split for the journey to school (the results exclude boarders at Dauntsey's). Mode split across years is similar with no discernible pattern of change. The high proportion of SBL pupils walking to school is a reflection of the school's closely confined catchment area. Only 9 per cent of pupils travel more than 3 miles to school, a distance which also approximately defines the radius of catchment, and not all of these pupils are entitled to free transport. The proportion of car trips is much lower than the national average. However, a high proportion of car journeys were within easy walking distance with only 30 per cent being greater than 2 miles. Low levels of cycling are likely to be due to steep hills and busy, narrow roads around the school and poor cycle parking facilities at the school. Travel to Dauntsey's shows a much higher dependence on the school bus service with much lower use of walking

reflecting the rural location of the school and the lack of a limiting catchment area. 80 per cent of day pupils travel more than 3 miles to school with 42 per cent travelling more than 10 miles to school. For journeys over 20 miles a higher proportion are made by school bus than by car. This is likely to reflect the increasing difficulty for children to be chauffeured to school as distance increases with less likelihood of the school journey forming part of a trip chain with the work trip.

19 per cent of all respondents expressed a desire to travel to school by an alternative mode of transport. Table 2 shows the distribution of desired mode changes. 1.4 per cent of all respondents wished to change from car to an alternative mode which represents over 7 per cent of pupils currently travelling by car. Reasons for not being able to change were distance for walking, weather for cycling and expense or availability for using the bus. However, the substantial proportion of the desired changes are towards car travel to the extent that the proportion of school trips made by car would increase from an average of 19 per cent to 32 per cent. The main reason given for these desired changes not taking place was the lack of someone available to drive the children. Cost was given as an alternative reason in some cases.

current mode	preferred mode			
	car	cycle	bus	walk
car	-	0.2	0.6	0.6
cycle	0.4	-	0	0
bus	6.1	0.8	-	0.4
walk	6.5	1.9	1.5	-
TOTALS:	13.0	2.9	2.1	1.0

Table 2. Desired mode changes (per cent of total survey sample wishing to change)

A similar issue was addressed in the Sustrans study of 8 secondary and 2 primary schools (Cleary, 1996). For most of the secondary schools, higher proportions of pupils were found to prefer travel to school by car through choice than actually did so. The same was true to a lesser extent for cycling. However, a lower proportion of pupils preferred to use public transport than did so. For the two primary schools, cycling was the most desirable mode at the expense of walking and car which were the main modes used. The study concluded that the greatest interest and potential for promoting cycling rests with school children aged between 10 and 13.

4.2 Leisure Travel

Figure 2 shows the mode split for the entire sample for a range of leisure destinations. Short distance trips are predominantly made by walking. However, as distance to the destination increases the proportion of walk trip declines with a increase in the proportion of car based trips accompanied by an increase in the proportion of bus trips. The high proportion of car based travel for the longer distance leisure trips is likely to be due to a combination of factors including the journey distance, whether the leisure trip is for a family activity (in which case the car may be seen as the cheapest and most convenient option) and the lack of a suitable public transport service to the destination. Figure 3 shows the proportions of respondents that expect to drive themselves in the future for such trips if a car is available. In many instances this will represent a change from being driven to actually driving, thereby maintaining

car dependence for such trips. There is a substantial change in mode split in favour of the car for travel to a shopping centre, predominantly at the expense of using the bus which currently accounts for over 30 per cent of such trips (the highest proportion of bus use for any of the leisure trips). While it may be encouraging that for the shorter leisure trips a large proportion of respondents intend to continue walking, it is likely that the particular leisure activities identified will become less relevant to respondents as they grow older, or accessibility afforded by the car may lead to alternative longer distance destinations for such activities.

4.3 Household Characteristics

Figure 4 compares the levels of household car ownership for the schools' sample against national figures. The disparity between them is readily apparent. Table 3 provides further comparison. Vehicle ownership for the survey households is substantially higher than the national average. This may be explained by an average household size over one-and-a-half times that of the national average. Indeed, cars per household individual compare well with the national average. However, if cars per adult is considered, both school samples have much higher levels of ownership. If cars per adult is taken as a proxy for household income then the survey sample represents households of above average income. The majority of households in the survey had either one or two children aged under 17. 87 per cent of household members aged 17 or over could drive. This was consistent between schools and compares to 67 per cent of all adults nationally. Nationally, licence holding varies with age, although it is greatest for people in the age range 30-39 at 81 per cent (DETR, 1997b).

	National	SBL	Dauntsey's	Combined school sample
cars per household*	1.02	1.67	2.11	1.81
individuals per household	2.54	4.22	4.06	4.18
cars per household individual	0.40	0.40	0.52	0.43
cars per adult	0.53	0.74	0.79	0.76

*assumes 3 or more cars equals 3

Table 3. Car availability for household members (national data is for the whole of Great Britain in 1996 (DETR, 1997b))

The figures suggest that either the respondents are collectively atypical of the total population of young people or that households representing young families have a greater need for car use and as a consequence have, on average, higher levels of car ownership. Results from the Sustrans study appear to corroborate the latter with an average of approximately 1.5 cars per household for the pupils surveyed from 8 secondary schools. The respondents are likely to experience car dependent behaviour from older members of their household and with nearly half of the combined SBL/Dauntsey's sample belonging to households with two or more cars, availability of a car for escort trips is likely to be high.

Figure 5 shows household car ownership by Year Group of the respondents for each school. In both cases there is an increase in levels of household car ownership for children in higher Year Groups. It is feasible that some households with children at or approaching the legal driving age increase their levels of car ownership in anticipation

of having an increased number of drivers in the family. This is likely to be particularly the case for Year 12 pupils at Dauntsey's, all of whom are aged 17 and are therefore in a position to learn to drive. It is also more likely that respondents in later year groups have older brothers and sisters who either have a car of their own or share a second car with a parent. The trend reflects car ownership rather than use but suggests that car dependence of the household is increased as an almost immediate response to a change in household age structure in relation to the driving age threshold.

4.4 Learning to Drive

Set against the high level of car dependence demonstrated by other household members (assuming ownership is matched with use) it is inevitable that pre-driving age teenagers are likely to be influenced in their own development and aspirations.

Intention of when to learn to drive once legal driving age is reached:	immediately	within 6 months	unsure	never
per cent of total sample	55	24	19	2
household members under 17	1.7	1.8	2.1	2.0
household members 17 or over	2.4	2.4	2.3	2.0
drivers per household	2.2	2.1	1.8	1.7
cars per household*	1.9	1.9	1.5	1.1
cars per driver*	0.9	0.9	0.8	0.6
per cent of household members aged 17 and over who are drivers	91.7	87.5	78.3	85.0

Table 4. Learning to drive (*assumes 3 or more cars equals 3)

The majority of respondents intend to begin learning to drive within 6 months of reaching the age of 17. Educational preference had no influence upon when respondents intended to learn to drive and those who hoped to continue to University were no more likely to delay learning to drive. Table 4 compares characteristics of the household against the conviction with which respondents wish to learn to drive. The responses regarding learning to drive were reasonably consistent across all Year Groups except for Year Group 7 (11-12 years) where 50 per cent were unsure. Respondents who wish to learn to drive immediately or within 6 months come from older households with a corresponding higher number of drivers and cars compared to households of respondents who are unsure about their intention for learning to drive or who have no intention to learn to drive. Although sample sizes of the latter two categories are much smaller these results imply that the state of car dependence of a household has, not surprisingly, an influence over the expectations of younger members of the household.

On average in Great Britain 46 per cent of individuals within the age range 17-20 hold a full car driving licence, based on data from the period 1993/95 (DETR, 1997b). This figure is considerably less than the 74 per cent for the age range 21-29. The difference between these two figures has been consistent over the last 20 years which indicates a high proportion of the population wait beyond the age of 20 before acquiring a driving licence. This gives noticeable differences from the stated preferences obtained in the survey. Although average income for the survey households is almost certainly above

the national average, the results suggest that the trend in high levels of licence holding is set to continue and may occur at an even earlier age.

Approximately 86 per cent of the entire sample thought that their parents would encourage them to learn to drive, 4 per cent thought that they would not and 10 per cent were unsure. These proportions do not vary much between the schools, although there is slightly higher encouragement for pupils from Dauntsey's. From the respondents wishing to start driving immediately, only a small proportion thought their parents would not give encouragement. At the opposite extreme, of the respondents with no intention to learn to drive, only a small proportion thought their parents would give encouragement. The four most frequently cited reasons (given in open response) for being given parental encouragement in learning to drive were 'so they don't have to take me everywhere' (43 per cent), 'so I become more independent' (22 per cent), 'so I can take them places' (8 per cent), and 'because you are disadvantaged if you don't drive' (7 per cent). Young people see themselves as dependent upon their parents who in turn are dependent upon their cars. By learning to drive they are able to benefit both themselves by gaining independence from their parents, and their parents by reducing the need/obligation to make escort trips.

Financial support from parents will also facilitate and encourage car dependence. 40 per cent of SBL respondents believed that their parents would pay for their driving lessons (the remainder either said no or were unsure). 63 per cent of respondents from Dauntsey's believed that their parents would pay for driving lessons. 69 per cent and 58 per cent of respondents from SBL and Dauntsey's respectively believed their parents would also offer some financial help in buying a car.

Figure 6 shows the expected degree of access to a car upon passing the driving test according to educational preference. Less than 10 per cent of pupils are unlikely to have access to a car. The progression from use to ownership and use is slowed by further education. This suggests that there may be some opportunity to promote car independent behaviour during years at University when young people are independent from their car dependent families and are far less likely to have access to a car, certainly in their first year at University.

5. CONCLUDING REMARKS

The study has underlined the extent to which car dependence is now part of modern lifestyles. Not only are the high household car ownership levels an indication of dependence amongst adults, but the views expressed by young people suggest that they have every indication of following suit. Parental support reflects the status of being able to drive as an element of successful development of young people. The expense and effort of passing the driving test must understandably be justified by car use, thereby achieving independence from parents. The car is by no means the predominant mode of travel for young people, particularly for the journey to school. However the high proportion of journeys to school by car that could realistically be replaced by walking and the substantial proportion of pupils that would prefer to travel to school by car reflect the dissatisfaction with the alternatives to the car or the perceived inadequacies of those alternatives.

Households with children have higher than average levels of car ownership. This reflects both the size of the household and probably the convenience and perceived necessity of the car for group travel. Consequently young people are living in environments in which the use of the car is likely to be more prevalent. Young people aspire to adulthood of which car use is seen as an integral part. In this context, making car use less attractive in the minds of parents through new pricing policies and restrictions is likely to influence the intentions of their children.

Young people are aware of the problems arising from increased traffic levels. The four most frequently recognised problems in the survey were air pollution, congestion, number of accidents and the expense of motoring. However such awareness is balanced by their aspirations. When asked to rank eight benefits of car ownership the most important benefits were seen to be freedom to travel to places otherwise inaccessible and independence from parents. The extent to which such benefits could be realised by alternatives to the car is not clear. However, it is likely that for the suburban and rural locations considered in the study the alternatives would not be able to compete.

Young people who have not passed their driving test have to use walking, cycling or public transport if they wish to seek independence from their parents for travel. If they are allowed to travel independently then it is at this age that such modes of travel can be promoted. The survey results indicate that car ownership can be delayed by the pursuit of further education. At this point young people typically begin living independently from their family for the first time and are far less likely to have access to a car. It would therefore appear to be appropriate to target this age group, particularly for the promotion of public transport. The extent to which this could be successful and cost effective is a separate issue.

This study was limited in scope by resource and timescale constraints. To gain a more detail appreciation of the development of car dependence in young people it would be desirable to use longitudinal panel surveys and study opinion and behaviour in an age range spanning pre-driving age and early post-driving age years. Such an approach would offer much greater insights into family activity and inter-relationships between household members.

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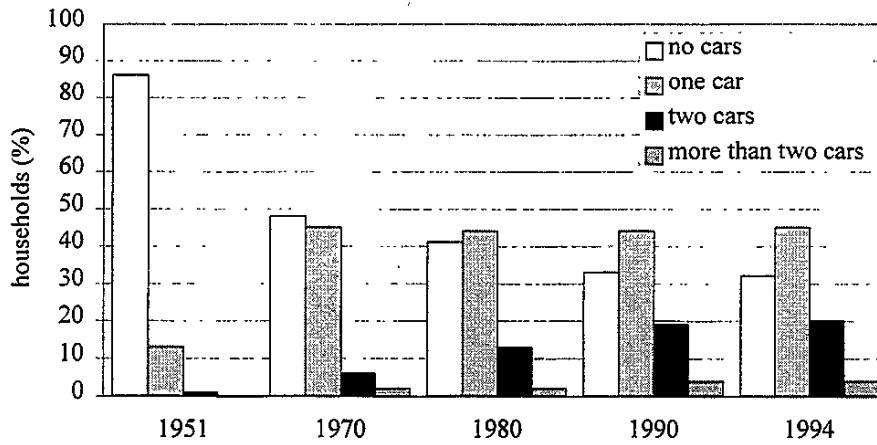


Fig. 1. Changes in car ownership levels (source: Potter, 1997)

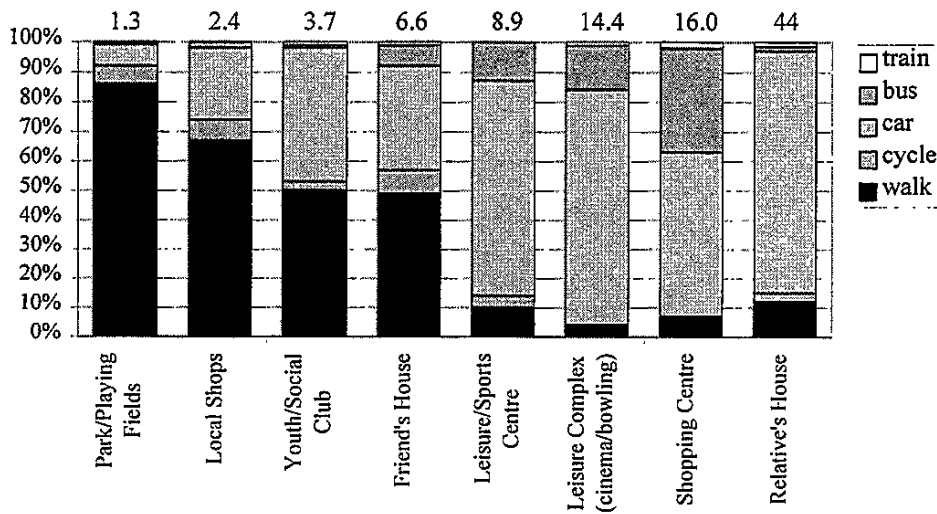


Fig. 2. Mode choice for leisure travel (numbers above columns denote mean distances in km)

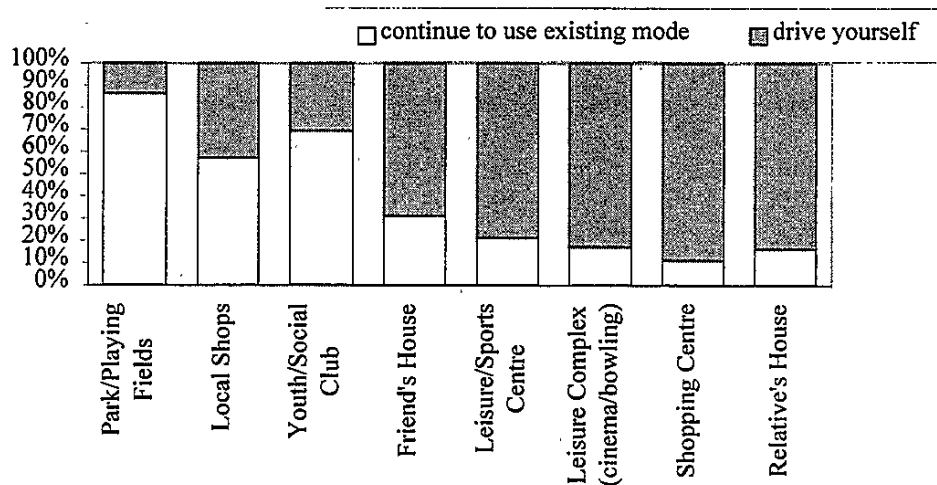


Fig. 3. "When you have access to a car will you use it to travel to these destinations instead of your current form of transport?"

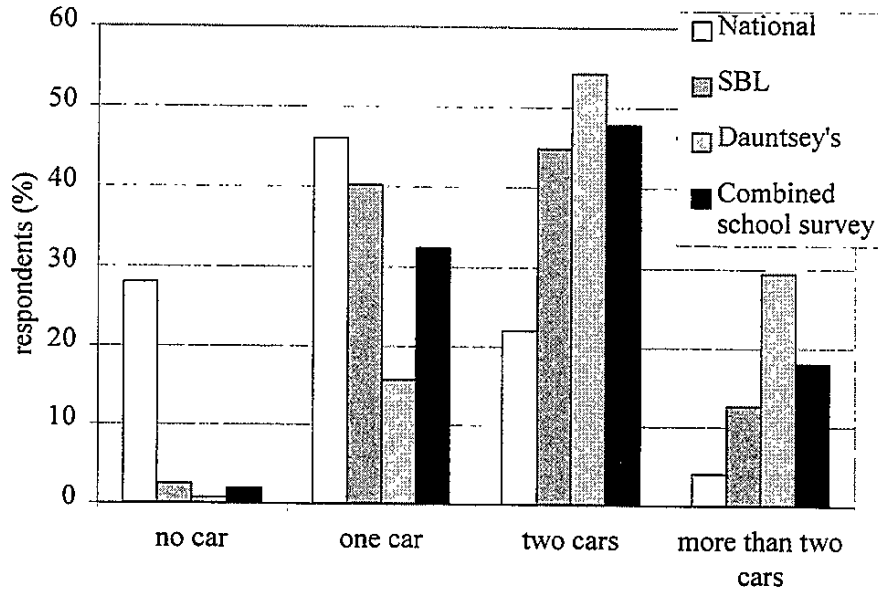


Fig. 4. Household Car Ownership levels (National levels for England and Wales exclude large metropolitan areas).

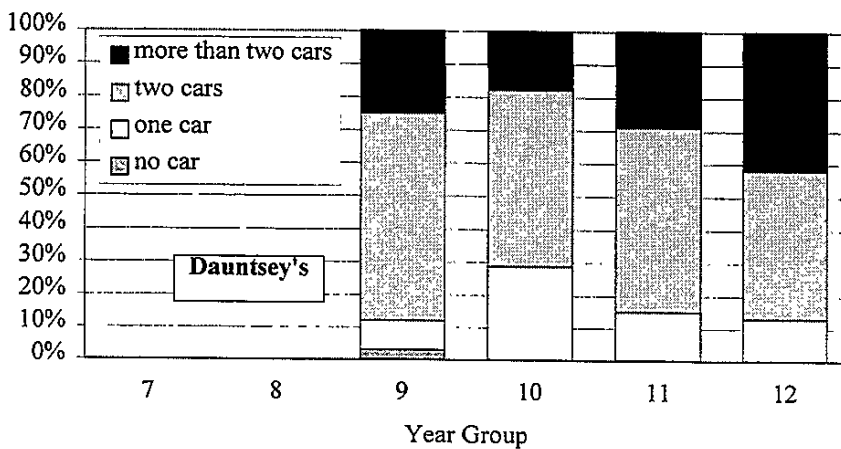
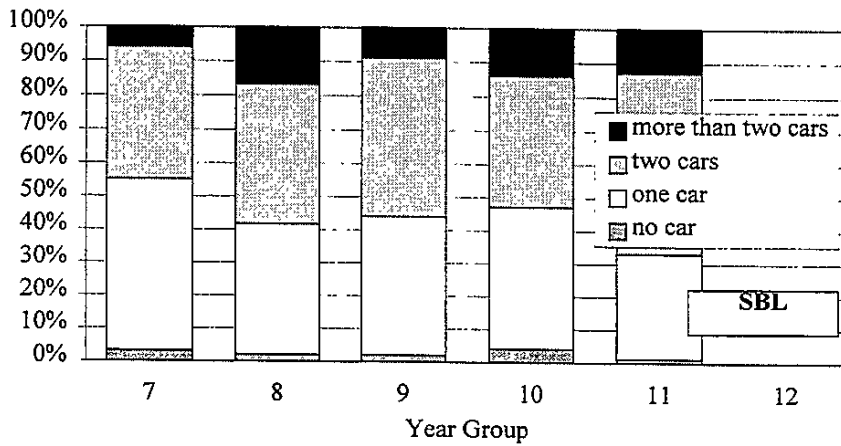


Fig. 5. Household car ownership by Year Group

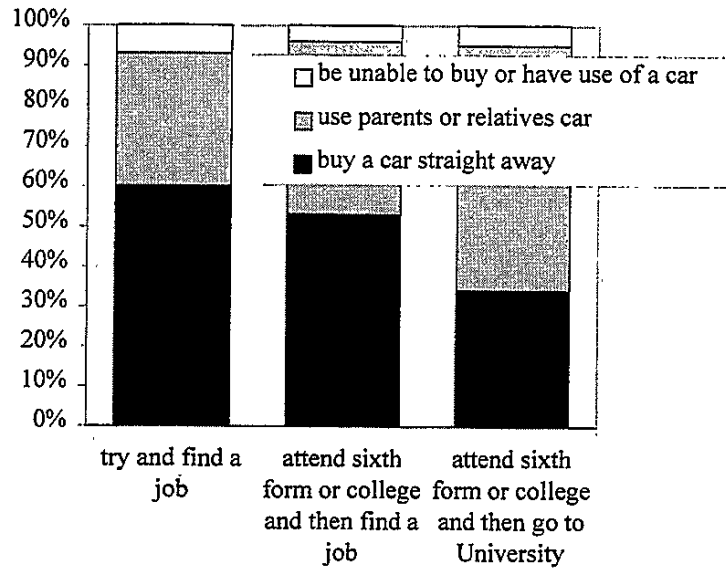


Fig. 6. Expected availability of a car to drive on passing the driving test against educational preference.

