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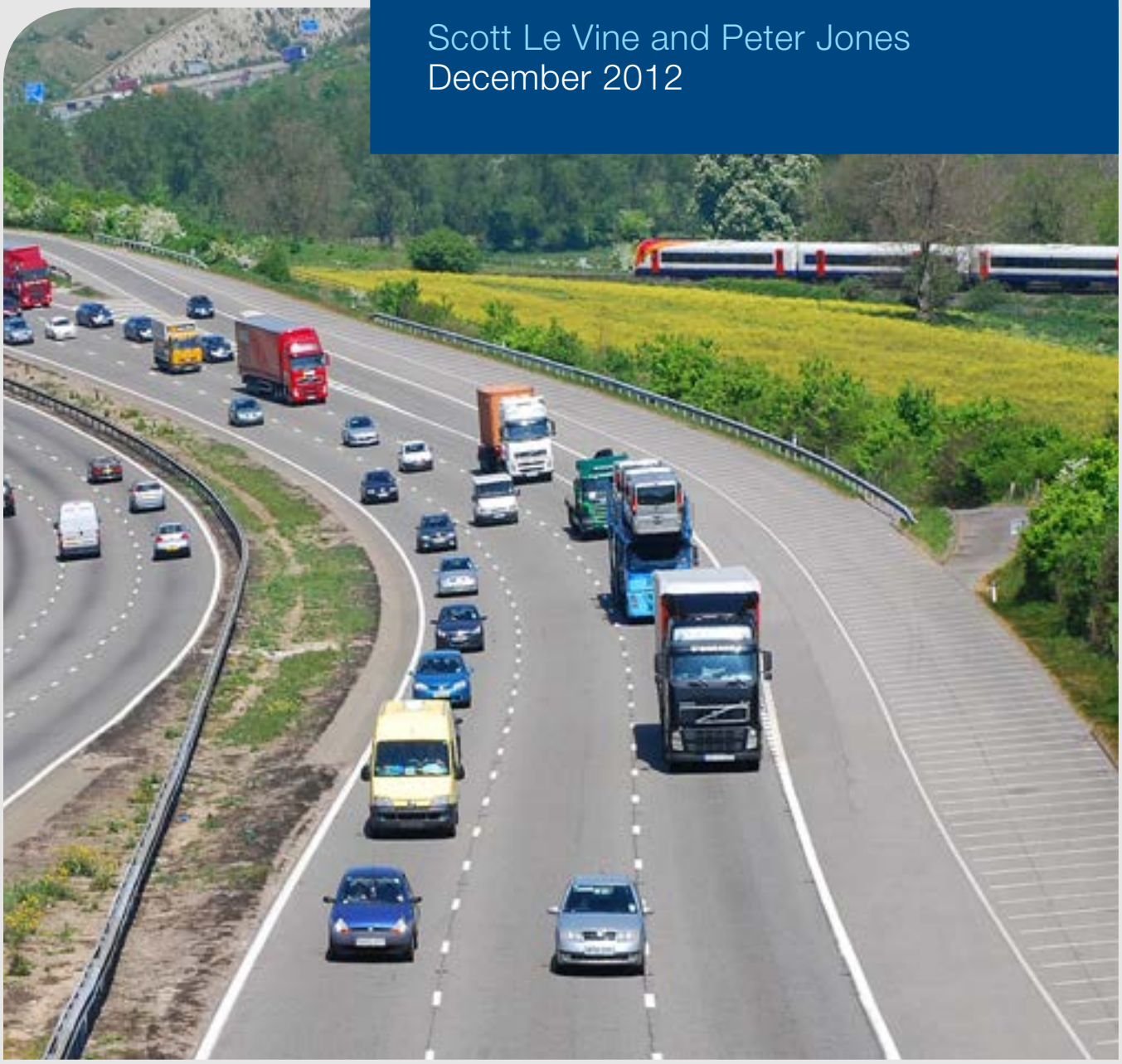
TRANSPORT SCOTLAND

Technical Compendium

On the Move – Supporting Paper 1

Scott Le Vine and Peter Jones

December 2012



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This Study

The main findings of the study are reported in *On the Move: Making sense of car and train travel trends in Britain*. A series of technical reports describe aspects of the work in more detail, and are available on the sponsors' websites:

- A supporting technical compendium containing figures and tables that were prepared but have not been included in this summary report
- 'Rail Demand Forecasting Using the Passenger Demand Forecasting Handbook'
- 'National Rail Passenger Survey Data Analysis'
- A report on trends in Scotland, using both NTS data and data from the Scottish Household Travel Survey

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Disclaimer

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Contents

1. Introduction

This document is a Technical Compendium of analyses of Britain's National Travel Survey (NTS) that complements and extends the material covered in the study *On the Move: Making sense of car and train travel trends in Britain*. It documents and puts into the public domain research that was performed on the study but not covered in the report.

It is published as a web-only version, and is made freely available on the four sponsors' websites (RAC Foundation, Office of Rail Regulation, Independent Transport Commission and Transport Scotland).

Details on the use of the NTS data are available in *On the Move*. It is noted that many of the results in this Technical Compendium are presented in analyses at an annual timescale, rather than in three three-year groupings (1995/7, 2000/2, 2005/7) as in *On the Move*.

It should be noted that these analyses are exploratory, and many will require further research with more sophisticated techniques or additional data sources to better understand what is causing the observed trends.

This document is organised into sections, each of which covers a particular topic area.

A selection of the key points follows:

Section 2: At the regional level, car driving travel correlates closely with car passenger travel. There has also been a sharper fall in car driving amongst men living with a woman having a driving licence than amongst men living without a woman having a driving licence in their household. This appears to be largely due to changes in company car use rather than a shift from car driving to car passenger travel.

Section 3: There are established reasons that driving mileage per capita estimates vary between the NTS and road traffic counts – but this difference has been growing over time, particularly amongst light vans. It is unclear what is causing this.

Section 4: Workers have been making fewer commuting journeys. The evidence suggests a modest but statistically significant link between a crude indicator of telecommunications usage and working at home.

Section 5: Car driving mileage increases during the working week from Monday to Friday. The percentage of rail travel taking place at weekends seems to have increased over time.

Section 6: Young people who do not drive cite a variety of reasons for this; of those saying that costs deter them they are more likely to say the costs of learning rather than the cost of purchasing a car, insurance, or general motoring costs. After accounting for age, income and other demographics, there is a strong link between being born outside of the UK and not having a driving licence.

Section 7: There is some evidence of 'yield management' practices in the rail industry leading to more low-cost rail tickets being sold, but this is not the case for commuting and business rail travel markets.

Section 8: Travel to visit friends and relatives at private homes has fallen over time. This is most pronounced amongst young people, and in the case of men the fall has taken place disproportionately at weekends.

2. Car Passenger Travel

The car occupancy rate (the number of people per car, including the driver) has remained in a narrow band between 1.5 and 1.6 throughout the period from 1995 to 2010.

It can be seen in Figure 1 that, as with car driving mileage, there is a clear relationship between car passenger mileage and settlement size – the average rural resident travels for a much greater distance as a car passenger than does the average Londoner, which is at the opposite end of the settlement size spectrum.

Figure 2 also shows that London has been somewhat unique amongst the regions of Great Britain, in that car passenger travel by Londoners has consistently trended downwards, a trend which is not found for other regions of Great Britain.

In Figure 3 it can be seen that at the regional level there is a quite close link between average car driving and car passenger mileage, with average driving mileage being between 60% and 98% greater in all regions of Great Britain. (A regression line drawn through this plot would have an r^2 value of 0.95.)

Figure 1: Car passenger mileage per person per year, by settlement size

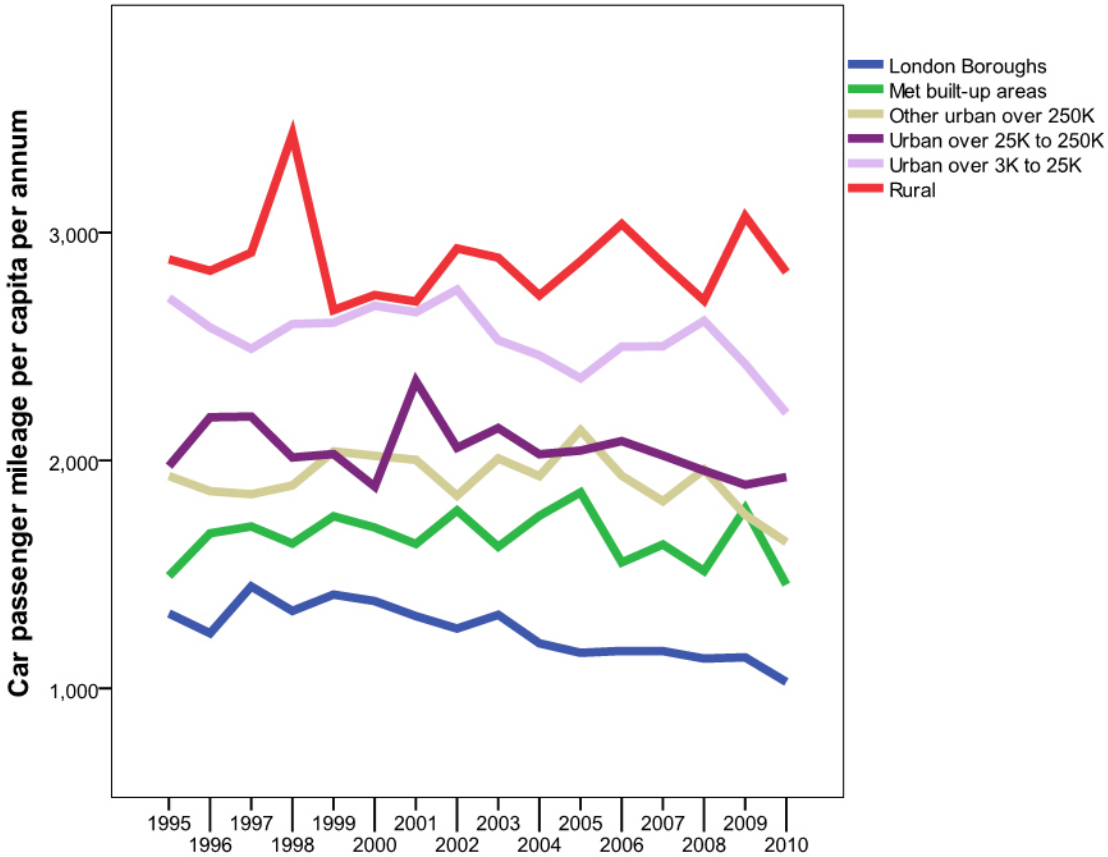


Figure 2: Car passenger mileage per person per year, by region of GB

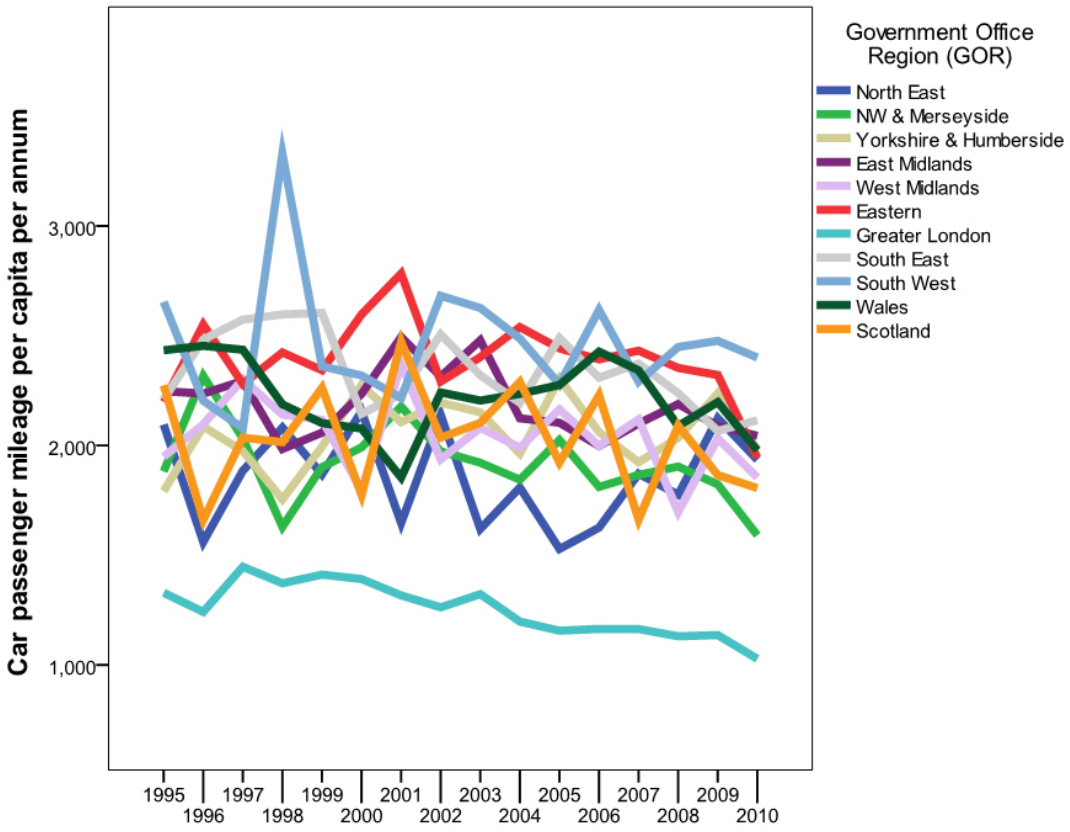
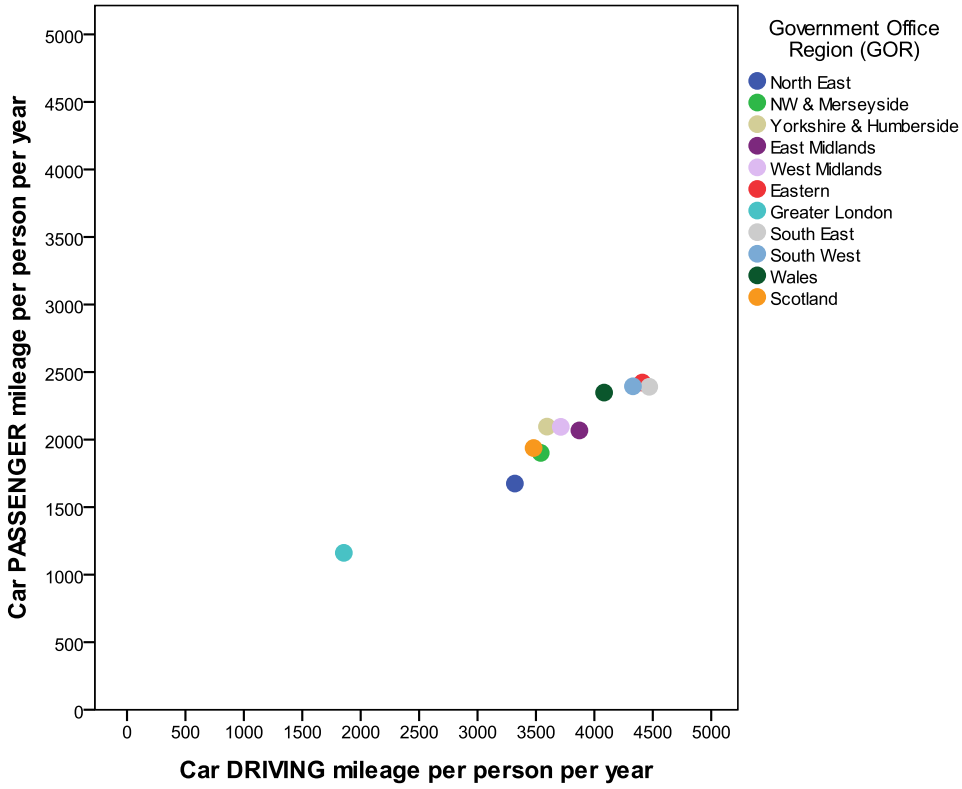


Figure 3: Car driving and car passenger mileage per person per year by region of GB, 2005/7

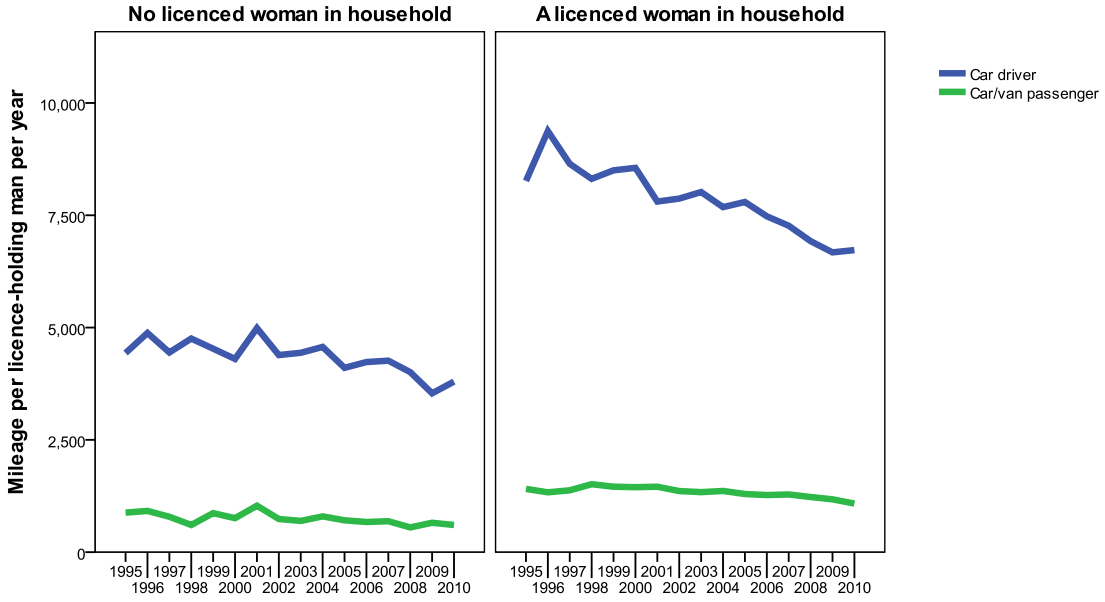


An intriguing result was turned up early in this study: when men are broken into two groups – those living with at least one driving-licence-holding woman in their household and those not – both of these two groups saw their diving mileage fall over time. But the group living with licence-holding women saw their driving mileage fall at a much faster rate. This result was found to be robust when investigated for all men as well as for only licence-holding men, as shown in Figure 4.

This raised the question: could car driving travel by these men simply be transferring to car passenger travel where they are being driven by the licence-holding women they live with?

Figure 4 shows however that this differential decrease of car driving mileage is not attributable to growing car passenger travel: apparently men living with licence-holding women have seen their car driving fall at a fast rate and from a high level, but this is not showing up in the form of them travelling more as car passengers.

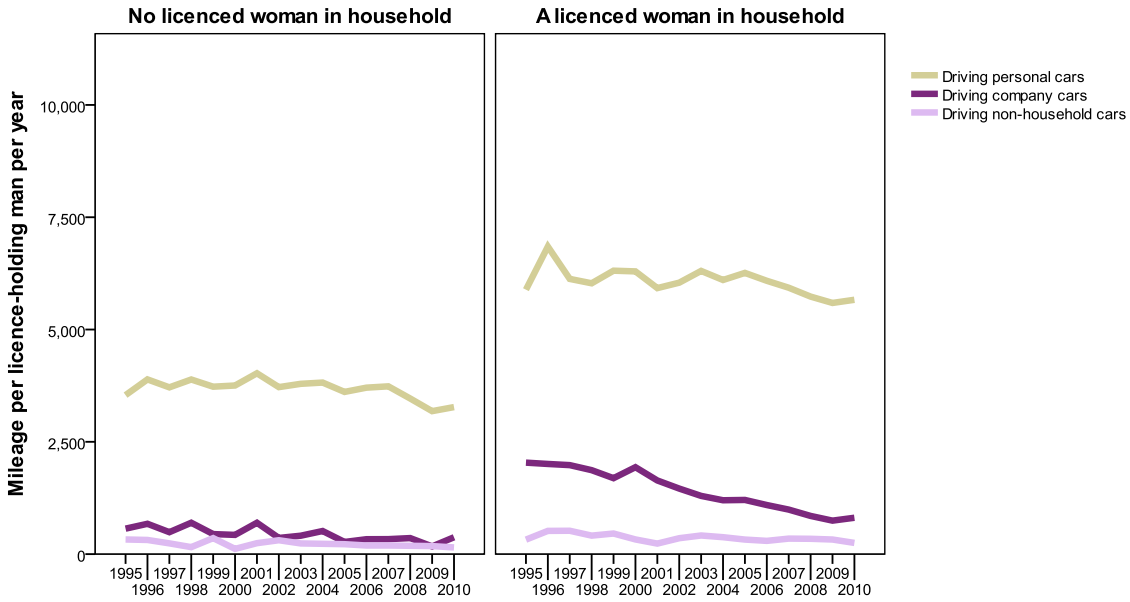
Figure 4: Car mileage per year by licence-holding men, by car driver/passenger and presence/absence of at least one licence-holding woman in household



On further study, the effect seems to be due primarily to a fall in company car use. In the mid-1990s company car driving was much higher amongst (licence-holding) men living with licence-holding women, and it has fallen sharply since then.

Interestingly, ***personal*** car travel has been much more stable for both men living with and without licence-holding women; nearly all the fall in their driving mileage (and the changing differences between the groups) is linked with company car use.

Figure 5: Car driving mileage per year by licence-holding men, by ownership type of car driven and presence/absence of at least one licence-holding woman in household


No licenced woman in household
A licenced woman in household
Mileage per licence-holding man per year
10,000
7,500
5,000
2,500
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Driving personal cars
Driving company cars
Driving non-household cars

3. Traffic Counts

It is well established that there are differences between estimates of per-capita car driving when measured by the NTS and the Road Traffic Estimates (RTEs), which are based on a continuous programme of automatic and manual traffic counts undertaken by the Department for Transport.

The RTEs yield higher estimates of per-capita driving, which are generally attributed to methodological differences. The NTS, for instance, explicitly excludes some travel, notably certain types of travel as part of one's job. A courier delivering a parcel would not report in their NTS diary their driving for work, but this mileage would in principle be eligible to be counted in the RTEs. There are a number of other notable differences: the NTS covers only British residents, so excludes all travel by visitors from abroad. The NTS and RTEs are also both based on sampling procedures, and in the case of the NTS it is known that response rates have drifted downwards over time.

While it is to be expected that the two data sources will yield different estimates, it is interesting that the differences seem to be growing over time. Figure 6 shows that for car driving mileage there has been an apparently growing gap between the NTS estimates and the RTEs. It is worth noting that in addition to the methodological differences noted above, there was a change of NTS contractor in 2002, and Figure 6 seems to show a step change in the 'gap' centred on 2002.

Figure 7 shows the same data as Figure 6, but for light vans instead of cars. Here the differences are striking: the RTEs show light van travel to have grown robustly right up to the 2007+ financial crisis, whilst the NTS shows falling levels of per-capita light van driving. In addition to the methodological differences noted previously, the definitions of 'light vans' are not identical in the NTS and RTEs. Nevertheless it is unexpected that they would yield such divergent trends, and further research will be needed to understand these results.

Figure 6: Car driving mileage per capita, National Travel Survey and Road Traffic Estimates, and the difference

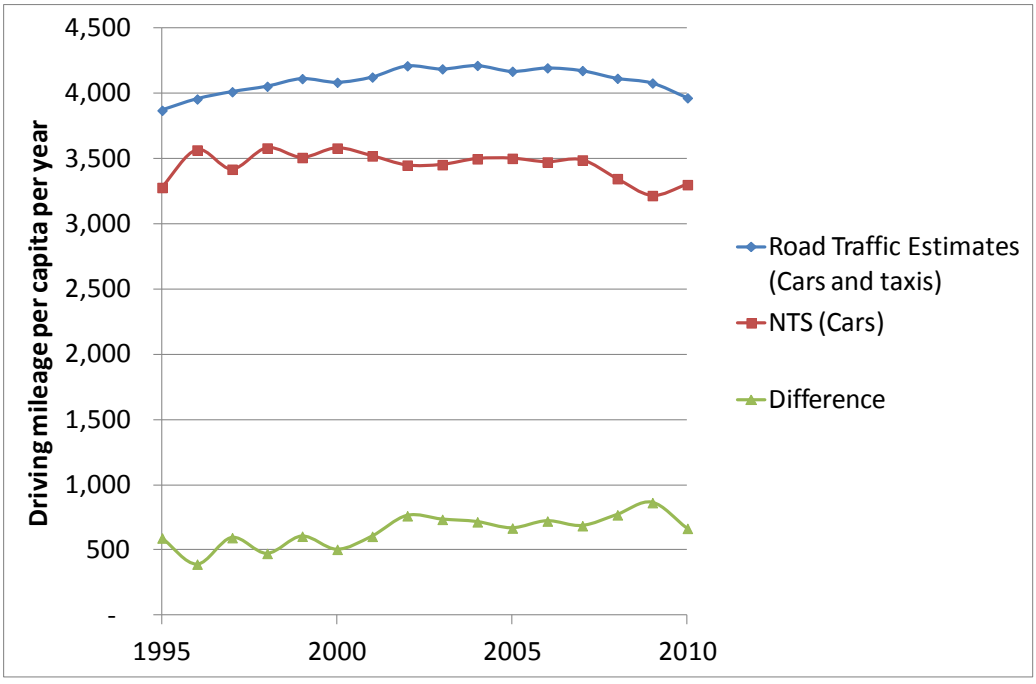
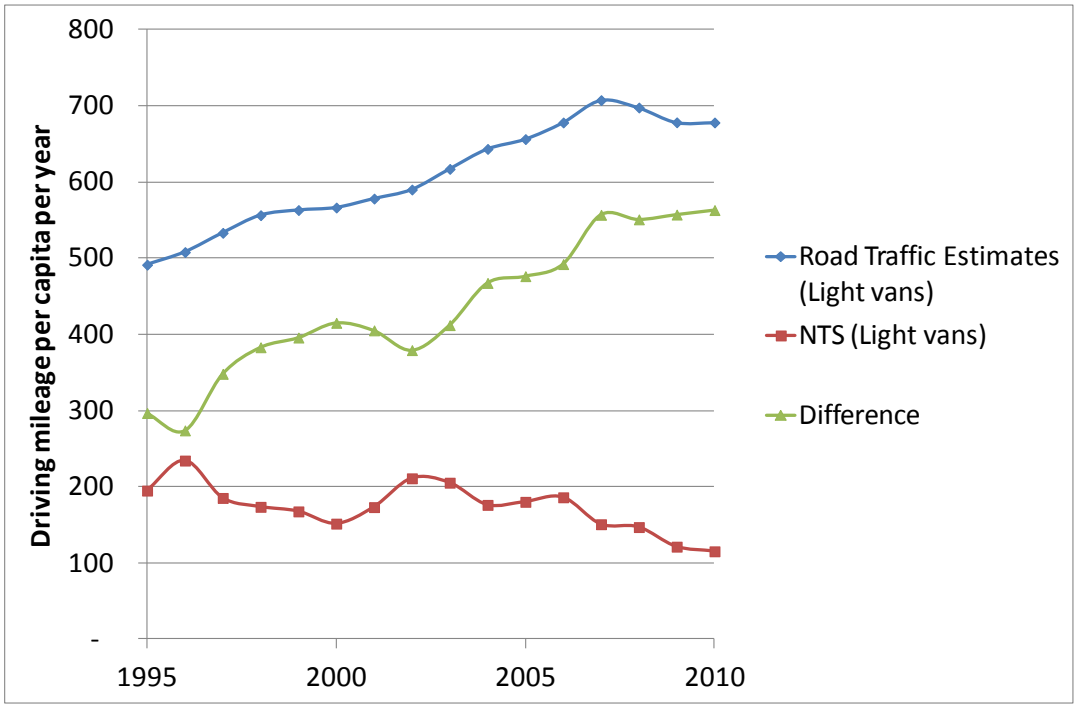


Figure 7: Car driving mileage per capita, National travel Survey and Road Traffic Estimates, and the difference



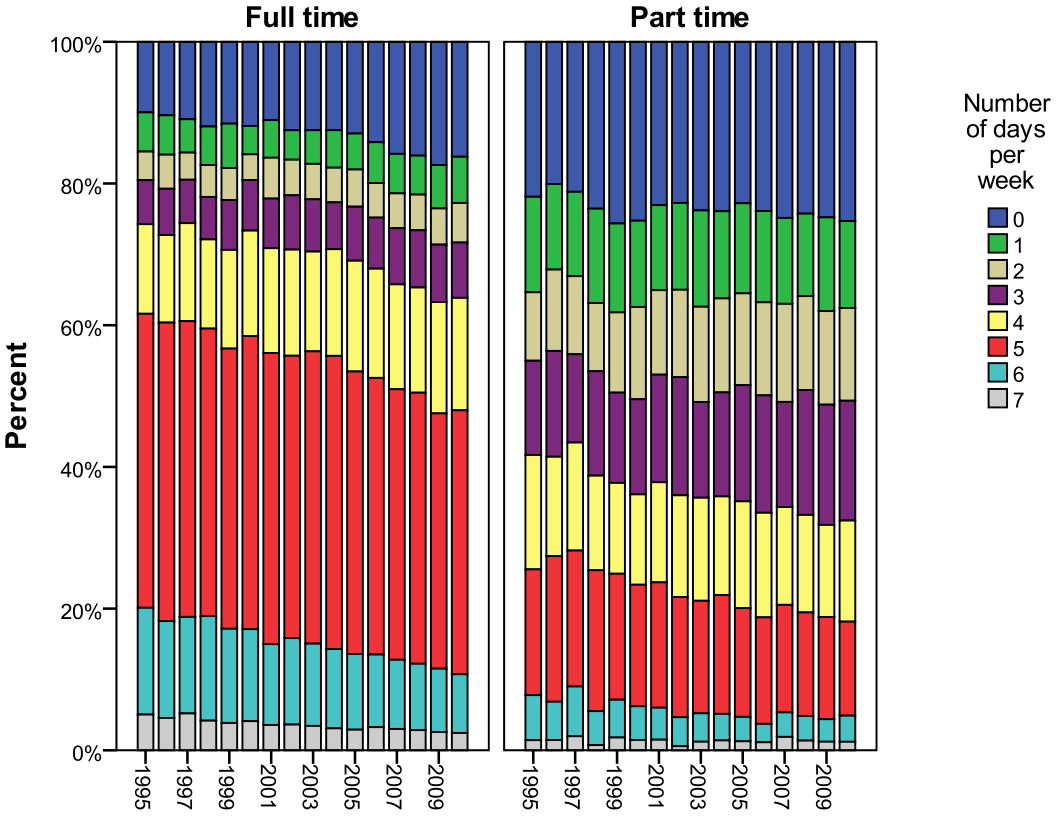
4. Working Practices

It has been observed that the number of commuting journeys and commuting mileage per capita have been trending downwards in recent years, whilst average commute lengths have not fallen. This section describes a set of analyses designed to yield insights into these changes in patterns of work travel.

As the NTS data contains a fairly complete record of journeys undertaken for work purposes by each NTS respondent during their diary week, it was processed to yield for each respondent the number of days on which they reported making at least one work-related journey.[1] This was assessed together with the NTS respondents' self-reports of whether they work full time, part time, or not at all.

When this was analysed, it was found that – mainly for full-time workers – the number of working days per week seems to have fallen over time, as can be seen in Figure 8. Somewhat surprisingly, it was found that the largest decreases were in the categories of full-time workers working six or seven days a week. For full-time workers, the prevalence of five-day-working weeks fell as well, but to a much smaller degree, and only in the period from 2004 onwards.

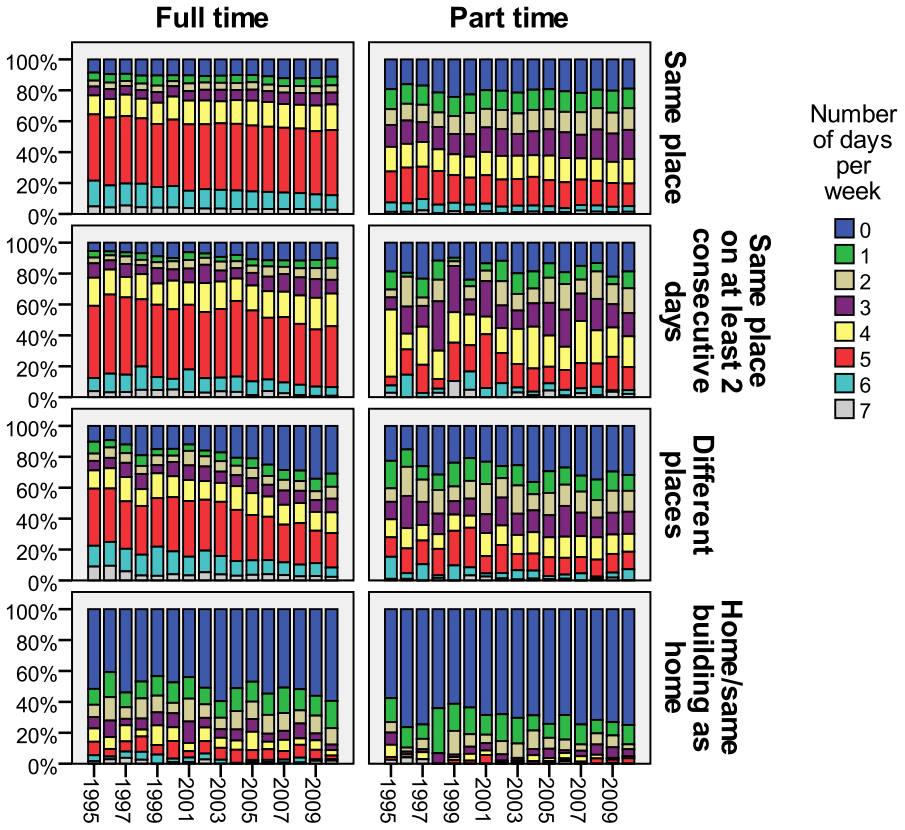
Figure 8: Percentage of full-time and part-time workers, by number of working days per week



[1] Any work-related journeys made on foot for less than ¼ mile are not recorded on days one to six of the NTS diary week. Certain types of work-related travel are also excluded from the NTS, as are all journeys partly or entirely outside of GB. For this analysis, work-related journeys include both commuting journeys (journeys made to/from a worker's usual place of work) and business journeys (made in the course of work).

One plausible explanation for this result is the growing prevalence of working at home: in 2002 8% of workers reported working at home either exclusively or more than once per week; this had risen to 11% by 2010. Figure 9 shows that when this analysis was rerun to account separately for people who work at home, however, the trend remained amongst people who do not work at home, and was strongest amongst people who report that they work at different places on different days.

Figure 9: Percentage of full-time and part-time workers by place of work, by number of working days per week



Note: All workers who do not go to the same workplace on at least 'two days running each week' are classified as working at 'different places'

Table 1 contains the results of two multivariate regression analyses: one where the number of days that each worker was seen to perform a work-related journey is the dependent variable, and a second where the dependent variable is the number of days per week that NTS respondents estimate that they typically work at home. The analysis includes only workers; non-workers are excluded. Only respondents to the NTS in years 2002, 2003, 2004 and 2008 are included. These are the only years that questions were asked in the NTS about the type of items that NTS respondents purchase online, via telephone or by post. What was collected are yes/no indicators of whether anyone in the responding household purchases each of the following items:

- Food and drink
- Clothes
- Books
- Furniture
- Travel
- Tickets (non-travel)

The regression made use of this variable as well as the others shown in Table 1.

Table 1: Results from linear regression analyses of number of days per week working out-of-home (centre column) and number of days working at home (right column), p-values in brackets

	n=39,555 r^2=0.08	n=39,555 r^2=0.04
	Dependent variable	
	# of days observed to undertake at least one work-related journey during NTS diary week	# of days in a typical week that respondent reports working at home, during NTS interview
Constant	2.94 (<0.01)	-0.193 (<0.01)
Year 2002	--	--
Year 2003	-0.0326 (0.28)	-0.0121 (0.41)
Year 2004	-0.0362 (0.23)	-0.0123 (0.40)
Year 2008	-0.217 (<0.01)	0.0300 (0.04)
Female	-0.217 (<0.01)	-0.00572 (0.61)
Age in years	-0.00296 (<0.01)	0.00952 (<0.01)
Personal income (£/year, 2010 prices)	2.46E-7 (0.71)	3.42E-6 (<0.01)
FT worker	1.21 (<0.01)	-0.145 (<0.01)
Socioeconomic group: Employer/manager	-0.236 (0.42)	0.591 (<0.01)
SEG: Professional	0.228 (<0.01)	-0.086 (<0.01)
SEG: Non-manual	-0.0444 (0.59)	0.491 (<0.01)
SEG: Personal service	0.266 (<0.01)	0.120 (<0.01)
SEG: Non-professional self-employed	0.035 (0.49)	0.0140 (0.57)
SEG: Manual	–	–
# of distinct items ordered for delivery by phone, internet or post by members of household	-0.0110 (0.11)	0.0280 (<0.01)
Frequency of deliveries per week for items ordered for delivery (all items combined)	-0.00202 (<0.01)	0.00274 (<0.01)

A number of the results from these regressions are of note, the first being that the goodness-of-fit for both models are small, which indicates that most of the variation in the number of working days is not being captured by these models. Also, as the dependent variables are in count form (0, 1, 2…7), the distributional assumptions for linear regression are not met and the results should be treated with some caution; an analysis using different distributional assumptions that are suitable for count data is needed in future.

In the 'NTS diary' analysis (of out-of-home working days) there is a *ceteris paribus* gender gap which implies that a woman is likely to travel to work roughly one fifth of a day per week less than an otherwise identical man. In the 'NTS interview' analysis

(of days working at home) no statistically significant effect due solely to gender is found.

In both analyses being an older worker is associated with a lower tendency to travel to work.

Higher personal income is positively associated with working at home in the 'NTS interview' analysis, but no significant effect due to income is found in the 'NTS diary' analysis. We may speculate that this is associated with greater flexibility as people advance in their career, though we can only suggest such a mechanism for this observed statistical association on the basis of this analysis, and in any case the effect suggesting this relationship is only significant in one of the two models.

Self-reporting as a full-time worker (as opposed to a part-time worker) is, not surprisingly, associated with travelling to out-of-home work-related activities for about 1.2 additional days per week in the 'NTS diary' analysis. It is also associated with working at home fewer days per week in the 'NTS interview' analysis.

An interesting result amongst the effects due to the type of work that one does is the effect due to being a professional worker (as opposed to the baseline of being a manual worker). The finding is that after accounting for income and the other effects in the analysis, the *ceteris paribus* effect of being a professional worker is that one is likely to travel to out-of-home work-related activities on more days per week (and likely to work at home on fewer days per week).

The final two results are particularly interesting – both of the indices for home delivery of goods (the breadth of items ordered as well as the frequency in which they are delivered) are negatively linked with the number of days working out-of-home (the 'breadth' variable at a p=0.11 significance level, however) and both at positively linked with the number of days that NTS respondents self-report that they work at home. (The effect of the 'breadth' variable is only significant at the p=0.11 level; all three other effects are highly significant.) These variables are two of very few indicators of the use of remote communications technologies that the NTS gathers, and the effects suggest that for otherwise identical workers, the one living in a household that orders all six types of enquired-about goods remotely and received deliveries at least three times per week (i.e. the highest possible score on this rough index of telecommunications usage) would work approximately 0.07 fewer days per week – which works out to a modest 1.5% drop in work-related journeys for a typical five-days-per-week worker. The analysis of number of days working at home implies an increase of 3.6% in the number of days working at home due to the highest possible score on the telecommunications usage index.

It should be noted that, though these findings of apparent linkages between telecommunications usage and work-related travel are robust after accounting for other effects, they should be viewed as suggestive-only pending more in-depth research. This would include both the use of more sophisticated statistical methods and drawing in additional types of data into the analysis.

5. Day-of-Week

Figure 10 and Figure 11 show the percentage of car driving journeys and mileage, respectively that is performed on each day of the week.

It can be seen that the number of car driving journeys made on Saturdays has trended down modestly over time, but that this is not the case for car driving mileage – meaning that average car driving journey length on Saturdays has been growing.

There is also a tendency for more car driving journeys and mileage to be made as the working week progresses from Monday to Friday, an effect which is more pronounced when the metric is mileage than when it is number of journeys.

Figure 12 and Figure 13 show the same information (number of journeys and mileage, respectively, by day of the week) for National Rail. As is the case generally with the rail usage observed in the NTS, the data is noisier than it is for car use.

Here we see much greater differentiation between weekday and weekend day than for car driving. Friday is not the weekday that sees the highest use as with car driving; rather it appears that Thursday is, with Monday being the lowest, both in terms of number of journeys and mileage.

There appears to have been an increase in the percentage of rail use that takes place on weekend days; this seems to be the case for journeys on Sundays, and for mileage (and less so, if at all, for journeys) on Saturdays.

Figure 10: Percentage of car driving journeys by day-of-week

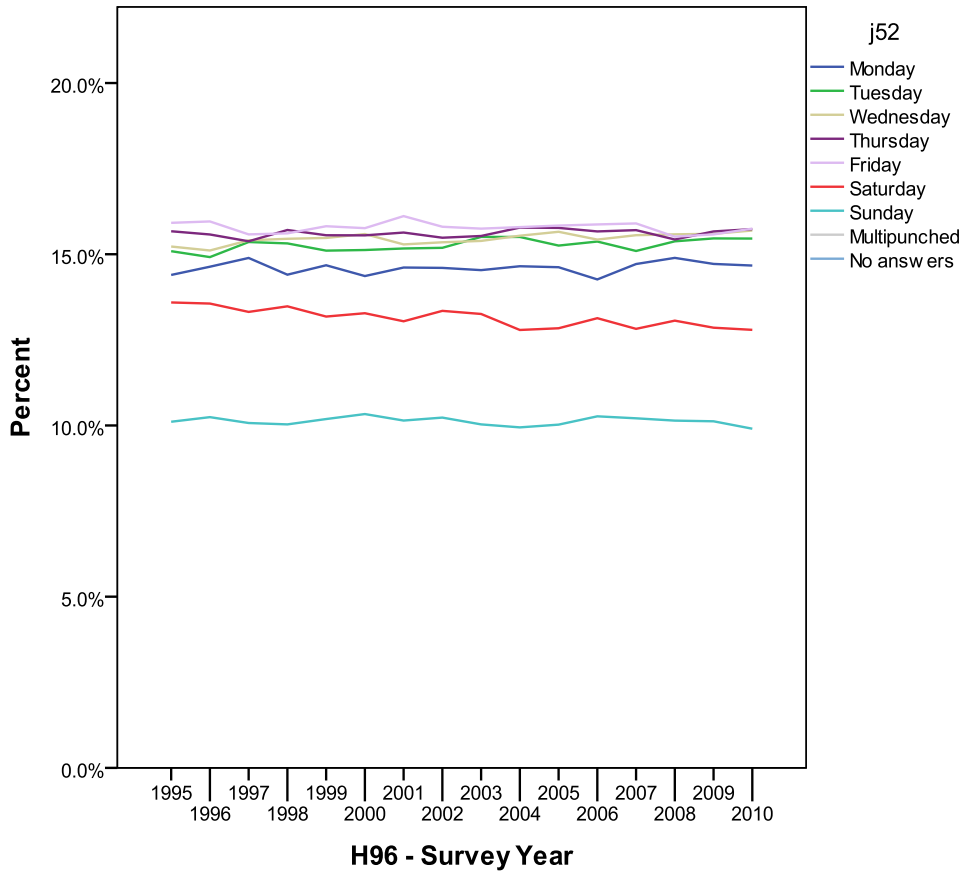


Figure 11: Percentage of car driving mileage by day-of-week

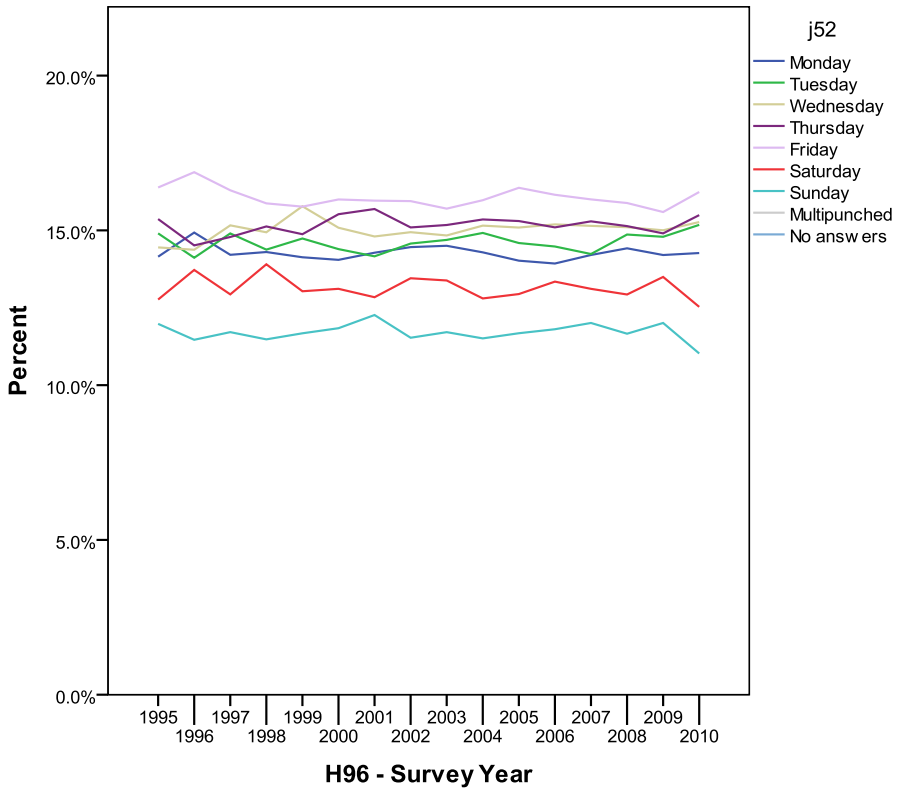


Figure 12: Percentage of National Rail journeys by day-of-week

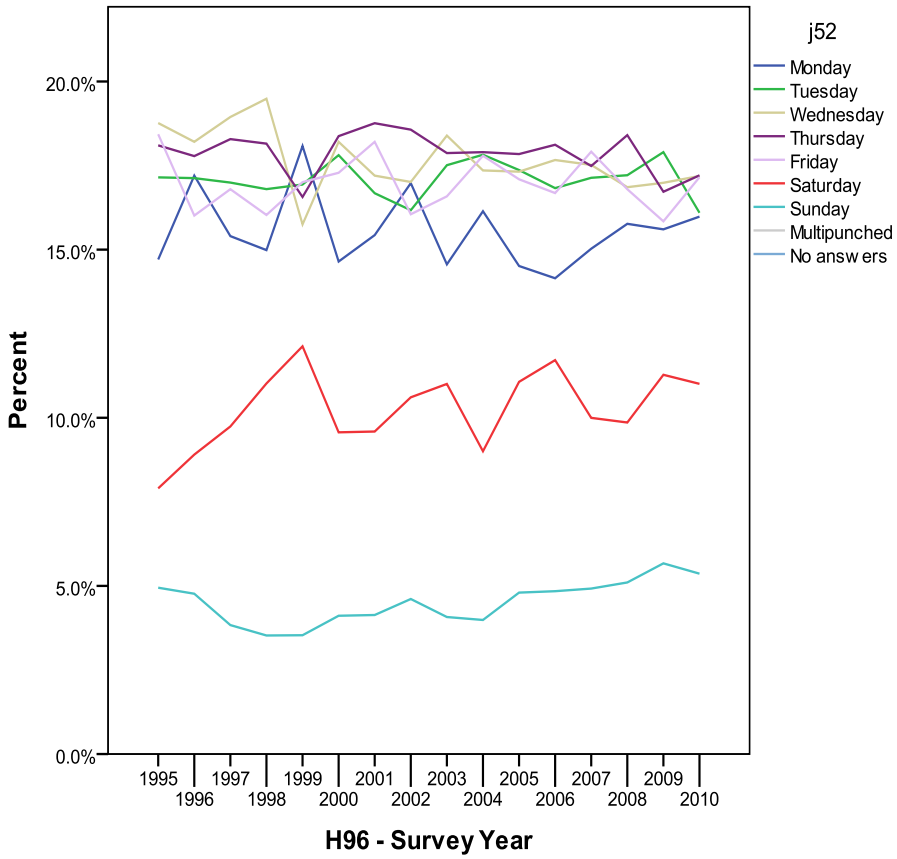


Figure 13: Percentage of National Rail mileage by day-of-week

6. Young People and Licences

This section looks at the falling level of driving-licence-holding by young people aged 17–29.

In recent years the NTS has been asking adults that do not have a full or provisional driving licence or are not learning to drive the reason(s) why they do not drive.

Figure 15 shows the percentage of the time that each reason is cited, as a proportion of the times it is cited as either the main or a secondary reason. The two reasons cited as the main reason more than half of the time that they were cited were: 'Physical/health difficulties' (89%) and any reason other than the classes in the listing (85%). At the other end of the scale, interestingly, were three of the reasons relating to the costs of driving: the cost of buying a car (cited as the main reason 17% of the time it was listed), unspecified 'other' motoring costs (14%), and the cost of insurance (11%). This is in sharp contrast to the costs of learning to drive: 62% of those people listing it cited it as the main reason they do not drive.

Figure 14 shows the different classes of reasons. The most frequently cited reason is the cost of learning to drive, which is cited by over 80%. The next three reasons, all of which were cited by over 20% of people, relate to not needing to drive, a lack of interest in driving, and the availability of other forms of transport. All other reasons were cited by less than 20% of people, with the smallest proportions saying that environmental reasons or congested roads kept them from having a driving licence, or admitting that they drive without a licence.

Figure 15 shows the percentage of the time that each reason is cited, as a proportion of the times it is cited as either the main or a secondary reason. The two reasons cited as the main reason more than half of the time that they were cited were: 'Physical/health difficulties' (89%) and any reason other than the classes in the listing (85%). At the other end of the scale, interestingly, were three of the reasons relating to the costs of driving: the cost of buying a car (cited as the main reason 17% of the time it was listed), unspecified 'other' motoring costs (14%), and the cost of insurance (11%). This is in sharp contrast to the costs of learning to drive: 62% of those people listing it cited it as the main reason they do not drive.

Figure 14: Reasons given by people aged 17–29 for not having a driving licence, 2009/10

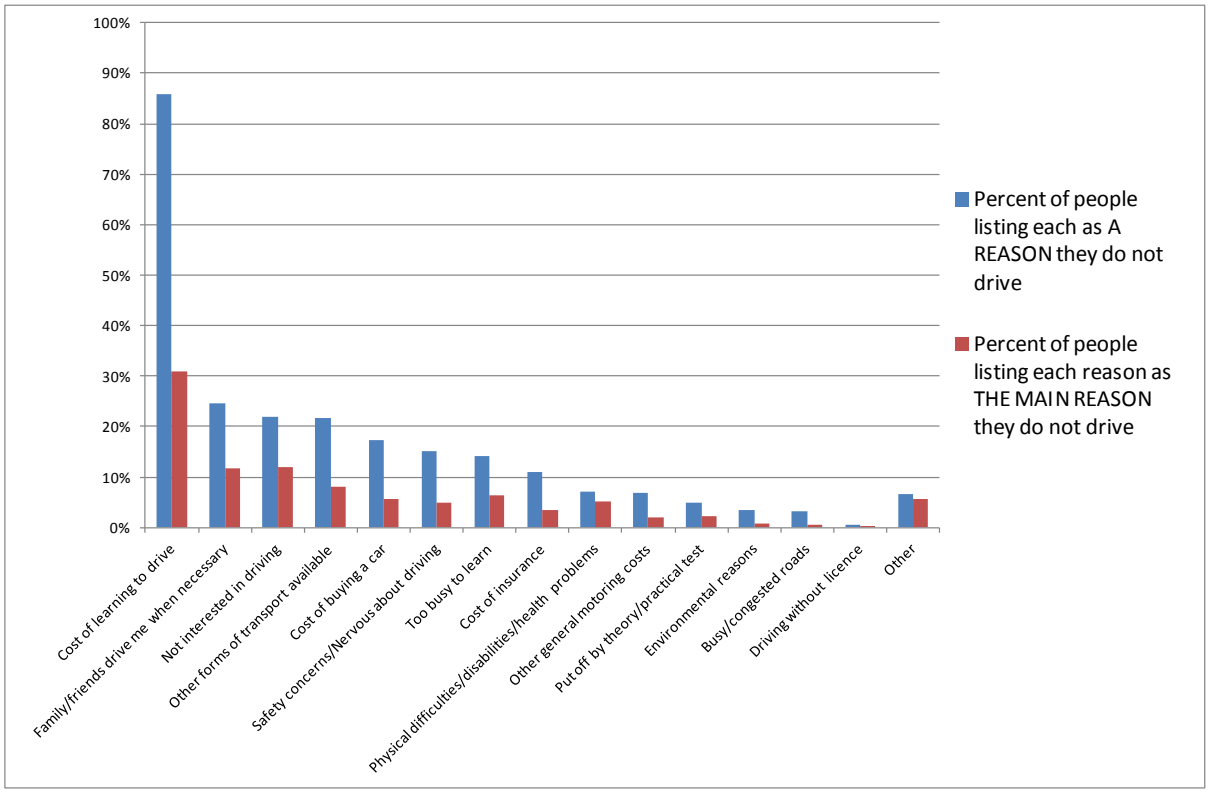


Figure 15: Of reasons given by people aged 17–29 for not having a driving licence, percentage saying that each reason is the main reason, 2009/10

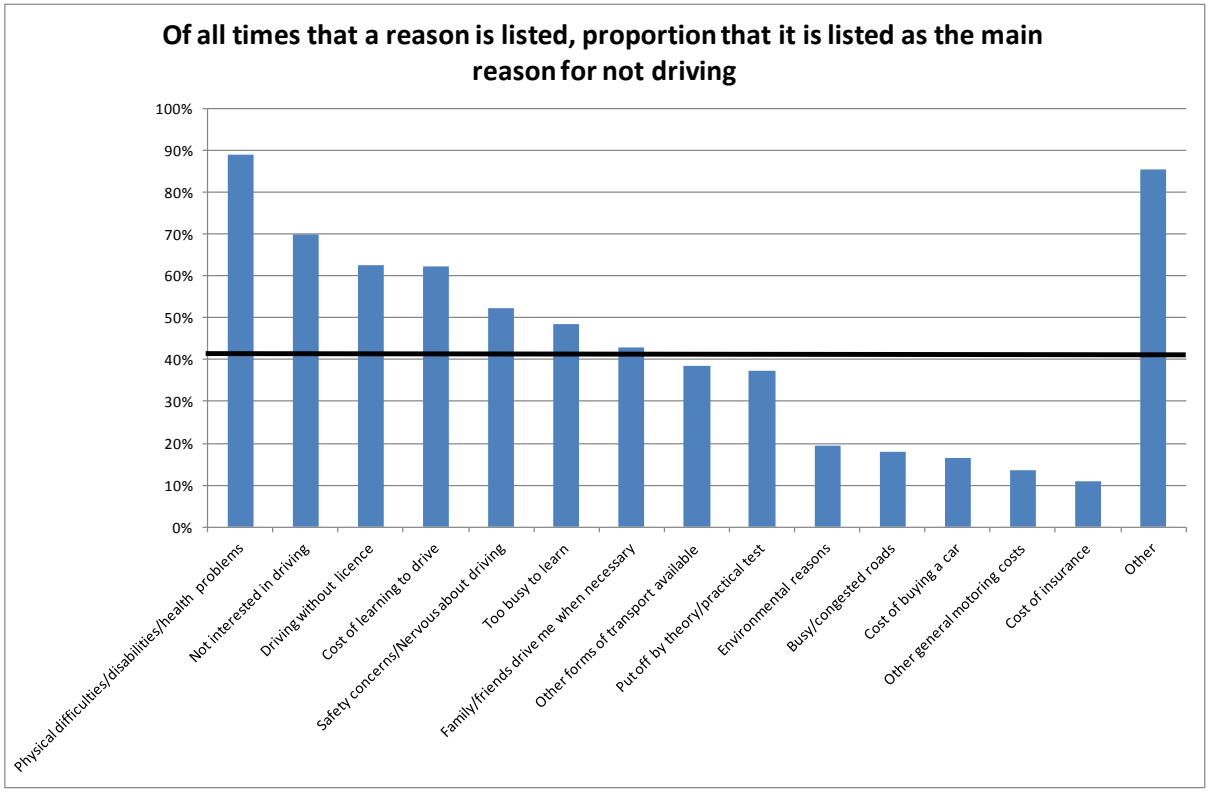


Figure 16 shows that nearly 50% (48%) of people listed only a single reason for not driving, and roughly three-quarters (74%) cited three or fewer reasons.

Figure 16: Frequency plot of number of reasons listed for not driving, people aged 17–29, 2009/10

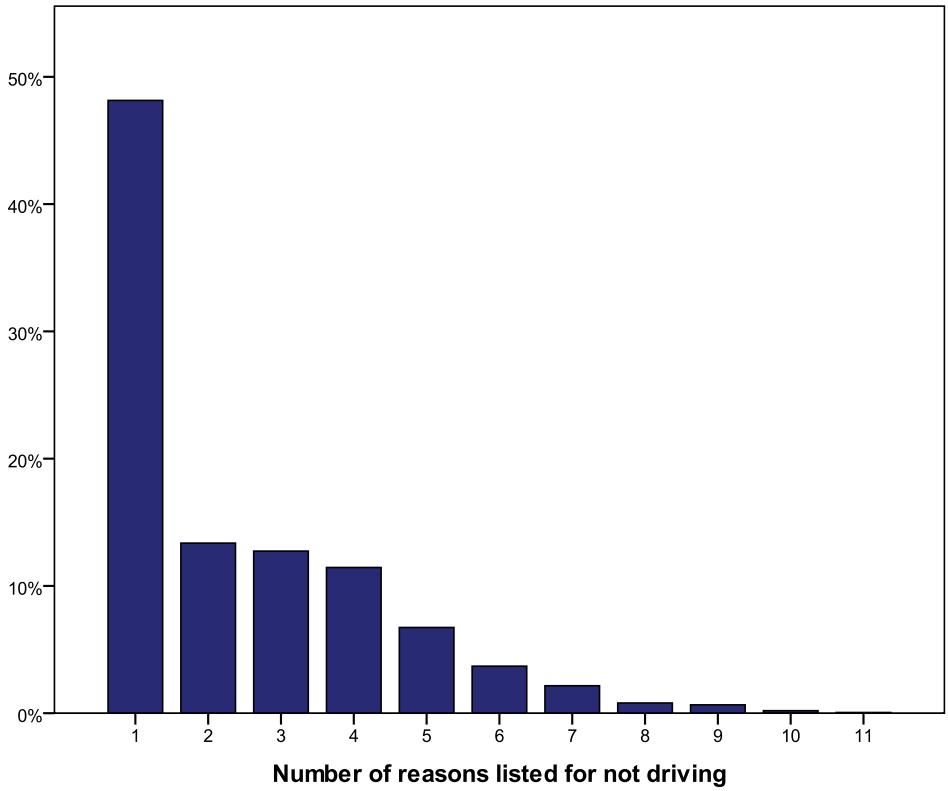


Table 2 compares the relative priority people placed on the various classes of reasons for not driving. The value in each cell is the proportion of time that the reason on the row is cited as the 'main reason', out of the total number of times that the reasons on both the row and column of the cell are cited *and* one of them is cited as the main reason. For example, when 'family/friends drive me' and 'other forms of transport are available' are both cited as reasons and one of them is cited as the main reason, 'family/friends drive me' is prioritised – cited as the main reason – 58% of the time and 'other forms of transport are available' is prioritised the other 42% of the time.

Amongst people citing 'safety concerns/nervousness about driving', this tended to be cited as the main reason (rather than merely a contributory reason) more than half of the time when compared against all other reasons with a sample of more than 25 people. This was also the case for people saying they were 'not interested in driving': this reason tended to be prioritised as the main reason listed.

When 'cost of learning to drive' was cited as a reason, it tended to be prioritised ahead of 9 of 11 other reasons. But interestingly, when the 'cost of insurance' was cited it tended to be listed as a contributory reason; this was the case when compared against all other reasons with a sample of more than 25 people.

Table 2: Matrix of prioritisation of reasons for not driving cited by people aged 17–29, 2009/10

When row & column reasons are both listed by a respondent, proportion where reason on row is prioritized over reason on column

	Family/friends drive me when necessary	Other forms of transport available	Cost of learning to drive	Cost of insurance	Cost of buying a car	Other general motoring costs	Environmental reasons	Safety concerns/ Nervous about driving	Physical difficulties/ disabilities/health problems	Too busy to learn	Put off by theory/practical test	Not interested in driving	Busy/congested roads	Driving without licence	Other
Family/friends drive me when necessary		58%	36%	74%	61%	66%	*	21%	*	31%	39%	28%	*	*	*
Other forms of transport available	42%		36%	78%	68%	77%	67%	26%	*	56%	36%	*	*	*	*
Cost of learning to drive	64%	64%		86%	83%	84%	70%	41%	*	61%	75%	44%	70%	*	*
Cost of insurance	26%	22%	14%		41%	36%	*	13%	*	24%	*	14%	*	*	*
Cost of buying a car	39%	32%	17%	59%		55%	*	24%	*	31%	*	13%	*	*	*
Other general motoring costs	34%	23%	16%	64%	45%		*	*	*	*	*	*	*	*	*
Environmental reasons	*	33%	30%	*	*	*		*	*	*	*	*	*	*	*
Safety concerns/Nervous about driving	79%	74%	59%	88%	76%	*	*		*	*	*	*	*	*	*
Physical difficulties/disabilities/health problem	*	*	*	*	*	*	*	*		*	*	*	*	*	*
Too busy to learn	69%	44%	39%	76%	69%	*	*	*	*		*	*	*	*	*
Put off by theory/practical test	61%	64%	25%	*	*	*	*	*	*	*		*	*	*	*
Not interested in driving	72%	*	56%	86%	87%	*	*	*	*	*	*		*	*	*
Busy/congested roads	*	*	30%	*	*	*	*	*	*	*	*	*		*	*
Driving without licence	*	*	*	*	*	*	*	*	*	*	*	*	*		*
Other	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

* = fewer than 25 responses

Table 3 contains the correlation matrix of the reasons cited for not driving. The matrix is colour-coded to highlight patterns: the colour ramp runs from green through yellow to red for large positive correlations through to large negative correlations.

It can be seen that people citing any one of the costs of driving also tended to site the other three classes of driving costs. By contrast, people citing health problems, being disinterested in driving, or 'other' tended to choose almost all other reasons relatively infrequently, particularly the cost of learning to drive. Interestingly, there were small positive correlations between citing environmental reasons and the costs of driving as the reasons that one is put off driving.

Table 3: Correlation matrix of reasons cited by people aged 17–29, 2009/10

	Correlations														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Family/friends drive me when necessary	A		0.28	-0.03	0.06	0.05	0.08	0.09	0.05	-0.08	0.08	0.07	-0.01	0.09	0.01	-0.11
Other forms of transport available	B	0.28		0.03	0.14	0.14	0.09	0.24	0.07	-0.08	0.14	0.09	0.06	0.16	0.00	-0.10
Cost of learning to drive	C	-0.03	0.03		0.55	0.52	0.32	0.08	0.04	-0.20	0.03	0.04	-0.23	0.08	-0.02	-0.21
Cost of insurance	D	0.06	0.14	0.55		0.76	0.49	0.16	0.07	-0.13	0.03	0.09	-0.09	0.14	-0.01	-0.13
Cost of buying a car	E	0.05	0.14	0.52	0.76		0.45	0.17	0.08	-0.14	0.03	0.06	-0.10	0.12	-0.02	-0.15
Other general motoring costs	F	0.08	0.09	0.32	0.49	0.45		0.12	0.03	-0.08	-0.01	0.07	-0.06	0.04	-0.02	-0.09
Environmental reasons	G	0.09	0.24	0.08	0.16	0.17	0.12		0.08	-0.03	0.12	0.03	0.10	0.22	-0.01	-0.02
Safety concerns/Nervous about driving	H	0.05	0.07	0.04	0.07	0.08	0.03	0.08		-0.01	0.00	0.09	0.01	0.26	-0.02	-0.07
Physical difficulties/disabilities/health problems	I	-0.08	-0.08	-0.20	-0.13	-0.14	-0.08	-0.03	-0.01		-0.09	0.00	-0.07	-0.03	-0.01	-0.07
Too busy to learn	J	0.08	0.14	0.03	0.03	0.03	-0.01	0.12	0.00	-0.09		0.03	-0.01	0.11	-0.02	-0.08
Put off by theory/practical test	K	0.07	0.09	0.04	0.09	0.06	0.07	0.03	0.09	0.00	0.03		-0.03	0.11	-0.01	-0.04
Not interested in driving	L	-0.01	0.06	-0.23	-0.09	-0.10	-0.06	0.10	0.01	-0.07	-0.01	-0.03		0.05	-0.03	-0.10
Busy/congested roads	M	0.09	0.16	0.08	0.14	0.12	0.04	0.22	0.26	-0.03	0.11	0.11	0.05		-0.01	-0.04
Driving without licence	N	0.01	0.00	-0.02	-0.01	-0.02	-0.02	-0.01	-0.02	-0.01	-0.02	-0.01	-0.03	-0.01		-0.01
Other	O	-0.11	-0.10	-0.21	-0.13	-0.15	-0.09	-0.02	-0.07	-0.07	-0.08	-0.04	-0.10	-0.04	-0.01	

A 'k-means' cluster analysis was then undertaken to extend the bivariate correlation analysis in Table 3 to simultaneously assess patterns amongst all reasons cited.

A four-cluster solution with intuitive properties was found, as shown in

Table 4. The values in each cell are the proportion of people in a given cluster citing each reason as either the main or a contributory reason for why they do not drive. The colour scheme is green to yellow to red corresponding to a large proportion of 'yes's through to a large proportion of 'no's.

A brief qualitative description of the clusters is:

- Cluster 1: **'Convenience'** – predominantly said that driving is unnecessary for them.
- Cluster 2: **'Cost alone' – p**redominantly said cost alone is the barrier to licence-holding.
- Cluster 3: **'Cost plus'** – cost frequently cited, as well as driving being unnecessary. A number of other non-cost reasons also cited more frequently than average.
- Cluster 4: **'None of the above' – n**o set of reasons is predominant. Cost of learning to drive (without any other costs) chosen most frequently of any reason.Table 5

Table 4: Proportion of cluster members citing each reason (clusters defined by reasons cited for not driving, people aged 20–29, 2009/10)

	Cluster			
	1	2	3	4
Family/friends drive me when necessary	0.76	0.00	0.82	0.00
Other forms of transport available	0.47	0.09	0.62	0.02
Cost of learning to drive	0.14	0.95	0.92	0.34
Cost of insurance	0.01	0.86	0.93	0.01
Cost of buying a car	0.06	0.93	0.90	0.04
Other general motoring costs	0.02	0.33	0.45	0.02
Environmental reasons	0.03	0.02	0.18	0.01
Safety concerns/Nervous about driving	0.06	0.10	0.19	0.08
Physical difficulties/disabilities/health problems	0.03	0.01	0.02	0.11
Too busy to learn	0.12	0.09	0.27	0.12
Put off by theory/practical test	0.06	0.06	0.12	0.04
Not interested in driving	0.13	0.04	0.24	0.23
Busy/congested roads	0.02	0.03	0.13	0.02
Driving without licence	0.01	0.00	0.01	0.00
Other	0.02	0.01	0.02	0.13

Table 5 shows profiles of the four clusters in terms of some basic demographics – it was found, for example, that members of the 'cost-alone' cluster has the lowest level of average income, both at the personal and household level. The 'Convenience' cluster had the highest proportion of its members living in Greater London, as well as the oldest average age. People in the 'Cost plus' cluster had the highest average incomes.

Table 5: Profile of clusters defined by reasons cited for not driving, people aged 20–29, 2009/10

	Cluster #1: 'Convenience'	Cluster #2: 'Cost alone'	Cluster #3: 'Cost plus'	Cluster #4: 'None of the above'	All people in sample
Percentage of sample (sample size in brackets)	22% (440)	21% (444)	13% (260)	44% (889)	100% (2,297)
Proportion female	55%	57%	58%	49%	52%
Average age	22.8	22.0	22.2	22.1	21.9
Average personal income (£/year)	£7,909	£5,960	£8,046	£7,060	£7,191
Average household income (£/year)	£37,567	£25,430	£38,625	£32,863	£35,556
Percentage living in London	29%	12%	15%	23%	21%
Percentage	32%	51%	67%	26%	29%

working full-time					

Respondents to the NTS are asked if they plan to learn to drive within the next year, the next year, the next five years, and so on. Using the responses of people saying that they expect to have a licence within the next year, a simple cohort analysis was performed to investigate whether there is a relationship between age and the actual rate at which people expecting to acquire a driving licence actually do so.

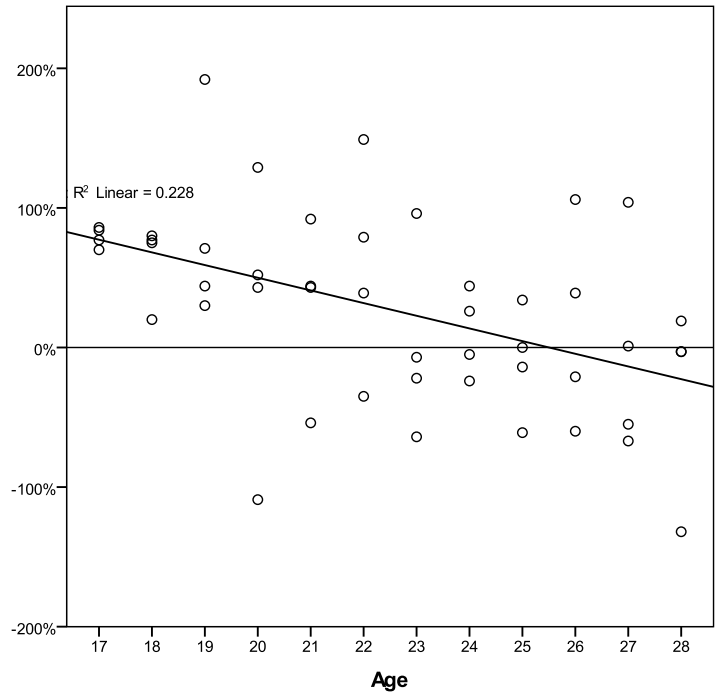
This analysis used data from 2006 to 2010. We observed, for example, the proportion of 17-year-olds in 2006 who do not have a licence but said they planned to acquire one in the next year. The actual percentage of 17-year-olds with a licence in 2006 was subtracted from the actual percentage of 18-year-olds in 2007, and this was then compared with the proportion of 17-year-olds in 2006 saying they planned to acquire a licence over the next year. This was done for ages 17 to 28 separately for each of the years 2006 to 2010.

Figure 17 shows the results of this analysis; each point in this plot represents the group of people of a single year of age over a single calendar year. For each year of age there are four points: one for the year of age in 2006 and a year older in 2007, one for that year of age in 2007 and a year older in 2008, and so on.

The main result from this analysis is that there seems to be a negative relationship between age and the actual rate of licence acquisition of people who had expected to have a license within a year's time. This implies that older people in this sample who said they expected to have a licence within a year seemed to be somewhat less likely to actually do so.

This analysis is based on a very simple specification – the application of more advanced time-series econometric techniques would be expected to (in all likelihood) confirm this finding and to yield additional insights into the dynamics of licence acquisition as young people age from their teens towards middle age.

Figure 17: Estimated actual licence acquisition rate of people aged 17 to 29 expecting to have a licence within the coming year, 2006 through 2010



The next analysis was a binary logistic regression of whether young people had a licence or not; results are shown in Table 6.

Table 6: Results from binary logistic regression of whether a person aged 17–29 has a full driving licence or not, 2009/10 (p-value in brackets)

	n=2,972 Null log-likelihood: -2,459.84 Final log-likelihood: -1958.37 Rho-squared: 0.20
Constant	-3.03 (<0.01)
Female	-0.141 (0.07)
Age	0.120 (<0.01)
Non-white ethnicity	-0.264 (0.03)
Born outside of UK	-0.623 (<0.01)
Personal income (£/year)	3.61E-5 (<0.01)
Residual household income (after subtracting personal income, £/year)	5.36E-6 (<0.01)
In employment	0.814 (<0.01)
Highest qualification is degree-level or higher	0.960 (<0.01)
Population density of postcode sector	-0.0105 (<0.01)
Lives in Inner London	-0.355 (0.11)
Lives in Outer London	-0.683 (<0.01)
Lives in a metropolitan area other than London	-0.175 (0.23)
Lives in a non-metropolitan area larger than 250K population	-0.0627 (0.66)
Lives in a settlement between 25K and 250K in population	-0.392 (<0.01)
Lives in a settlement between 3K and 25K in population	-0.266 (0.11)
Lives in a rural area	–

The *ceteris paribus* gender gap (the higher propensity for women to not have licences) is significant at the 0.07 level, just less significant than the standard 0.05 threshold.

The marginal effect of age is an increased tendency to hold a licence.

Being non-white is associated with a lower rate of licence-holding, all else being equal. The same goes for being born outside the UK. The effect of being born abroad is more than twice as large as the effect of being non-white.

Higher Income is associated with holding a licence, more so at the personal level than for income earned by other members of one's household, though both effects are highly significant.

Being employed and having a highest qualification that is at least at degree-level are both strongly associated with having a licence.

Higher-density neighbourhoods (as defined by the postcode sector of one's residence) are associated with lower rates of licence-holding, all else being equal.

The final variables included relate to the settlement size of the area where one lives. What is interesting is that there is not a fully monotonic relationship between settlement size and propensity to have a driving licence, once the other effects in this model are taken into account. Of all the settlement size categories (ranging from rural through to, separately, Inner and Outer London), we find that the lowest propensity to have a driving licence is linked with living in *Outer* London, whereas the highest propensity to have a licence is associated with residing in a rural area.

The last of the analyses of young people's licence-holding was a second binary logistic regression, where the dependent variable was defined to be one if a non-

licence-holding person cited one of the costs of motoring as the main reason they do not drive and zero otherwise. Thus the sample for this analysis only includes people who do not have a full or provisional driving licence or are not learning to drive.

Table 7: Results from binary logistic regression of whether a person aged 17–29 has a full driving licence or not, 2009/10

	n= 974 Null log-likelihood: -785.65 Final log-likelihood: -722.03 Rho-squared: 0.08
Constant	1.316 (<0.01)
Female	0.227 (0.07)
Age	-0.0516 (<0.01)
Non-white ethnicity	-0.0312 (0.88)
Born outside of UK	-0.814 (<0.01)
Personal income (£/year)	-2.78E-5 (0.01)
Residual household income (after subtracting personal income, £/year)	-1.02E-5 (<0.01)
In employment	-0.00436 (0.98)
Highest qualification is degree-level or higher	-0.00899 (0.71)
Population density of postcode sector	-0.00150 (0.56)
Lives in Inner London	-0.358 (0.31)
Lives in Outer London	-0.298 (0.27)
Lives in a metropolitan area other than London	0.0859 (0.74)
Lives in a non-metropolitan area larger than 250K population	0.0853 (0.73)
Lives in a settlement between 25K and 250K in population	0.0871 (0.72)
Lives in a settlement between 3K and 25K in population	0.190 (0.53)
Lives in a rural area	–

We see that the goodness-of-fit for this model is much lower (0.08) than for the previous model of whether a person has a licence or not (0.20) – thus this simple specification proves less able to explain patterns of whether young people consider the costs of motoring to be deterring them from driving.

Once again we happen to find an all-else-equal gender gap (in this case implying that a woman is less likely to cite cost as the main reason than an otherwise identical man), but significant at the p-0.07 level.

Being older is associated with being less likely to cite cost as the main reason for not driving.

No significant or close-to-significant effect due to ethnicity was found (the variable we tested is binary for white/non-white). Being born outside the UK was, however, found to be strongly associated with *not* citing cost as the main reason for being put off driving.

Income both at the personal and earned-by-others-in-household levels was found to be associated with a lower propensity to cite cost as a deterrent, a rather intuitive finding.

The remaining variables (whether one is employed, population density of one's neighbourhood, and settlement size) were all found not to have statistically significant effects.

7. Rail Fares

This section investigates whether there is evidence of 'yield management' – the notion of selling a larger number of cheap rail tickets in order to fill seats that would otherwise go empty.

The analysis looks at the distribution of rail tickets on the basis of their price, which is in 2010 price levels normalised by journey distance. The unit of analysis is the 'journey stage', which basically means that any journey which involves transferring between trains is counted in the data as separate journey stages for each train that was boarded.

Due to the small sample sizes for rail in the NTS, this analysis is based on two year groups: 1995 to 1999, and 2006 to 2010. Journey purposes are combined into three categories: commuting, business, and all travel for any other purposes.

The six figures that follow (Figure 18 to Figure 22) show cumulative distribution plots for the three classes of journey purposes, first the full distributions (with the exception of truncated upper tails) and then with the bottom of the distribution magnified.

The distributions only include journeys where some fare was paid – they exclude journeys made on season tickets, but do include pay-per-journey means of payment such as pre-purchased carnets.

It can be seen that for commuting and business journey purposes the proportion of tickets sold at low cost-per-mile actually decreased – thus we do not find evidence for 'yield management' pricing have affected these rail markets.

We do find evidence of yield management in the all-but-commuting-and-business market, however – here the data shows an increased proportion of rail tickets sold at low-cost-per-mile. 10% of rail tickets were sold for less than nine pence-per-mile in 1995/9; this rose to 14% of tickets being sold for less than nine pence-per-mile by 2006/10.

These results are broadly reasonable – one would expect the largest amount of available seating (i.e. conducive to yield management) on trains operating outside of the peak hours, which is precisely when non-commuting/business journeys tend to be made. They should be viewed in light of the distinction between those rail fares that are regulated and those where the operator has greater discretion in setting price levels.

Figure 18: Cumulative distribution of National Rail fares for commuting purposes

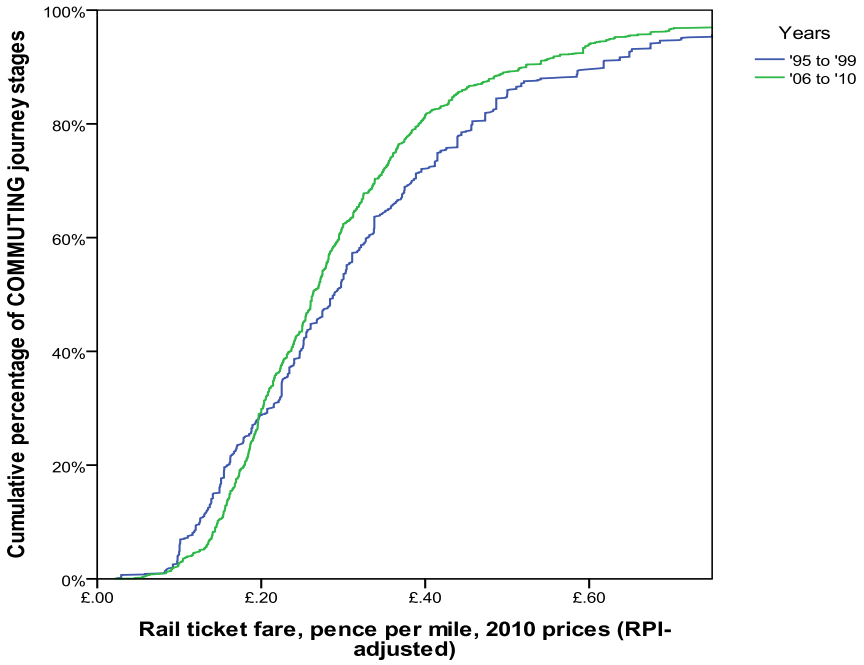


Figure 19: Cumulative distribution of National Rail fares for commuting purposes, bottom of distribution magnified

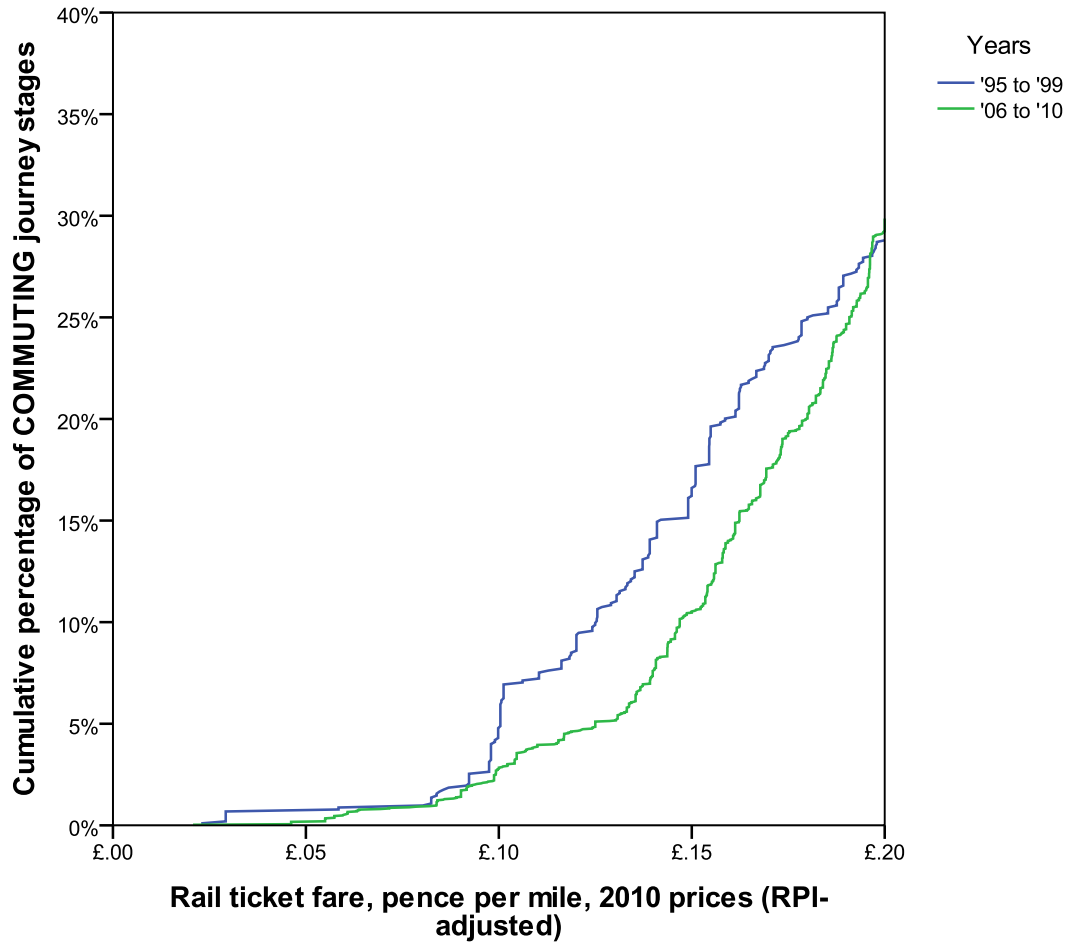


Figure 20: Cumulative distribution of National Rail fares for business purposes

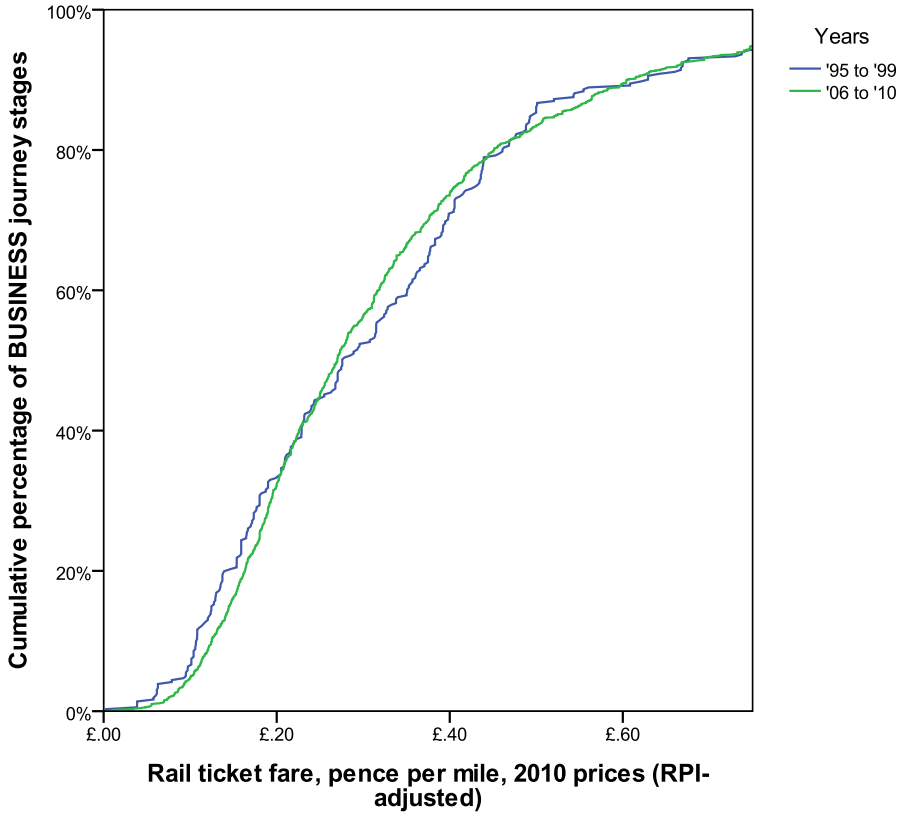


Figure 21: Cumulative distribution of National Rail fares for business purposes, bottom of distribution magnified

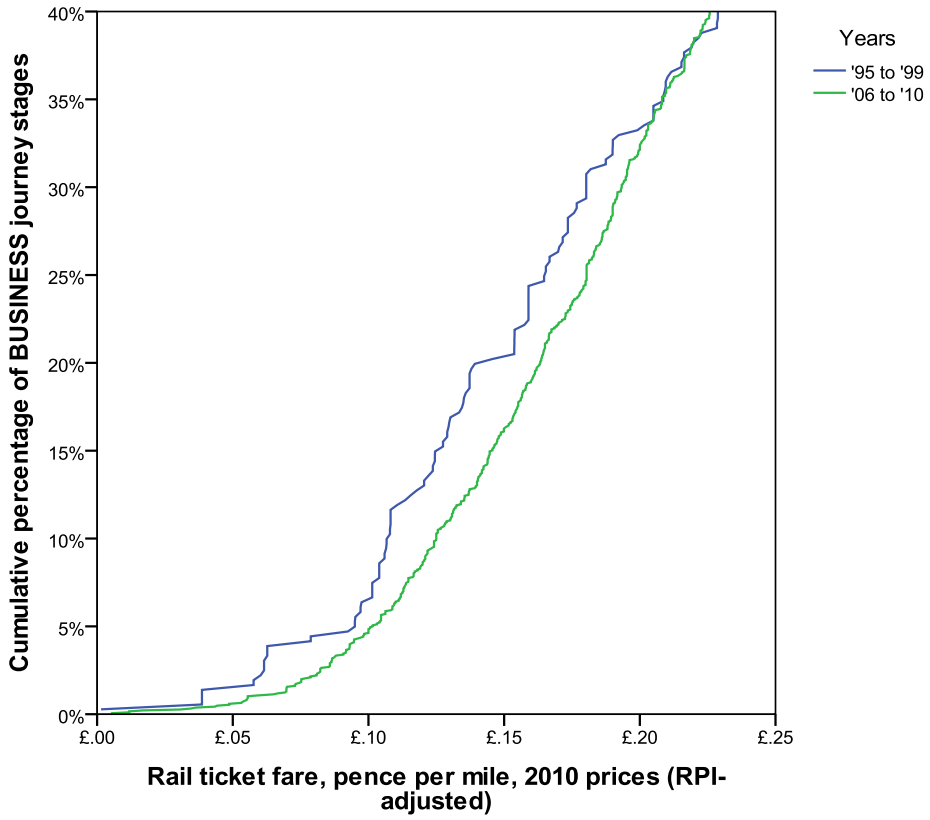


Figure 22: Cumulative distribution of National Rail fares for all but commuting and business purposes

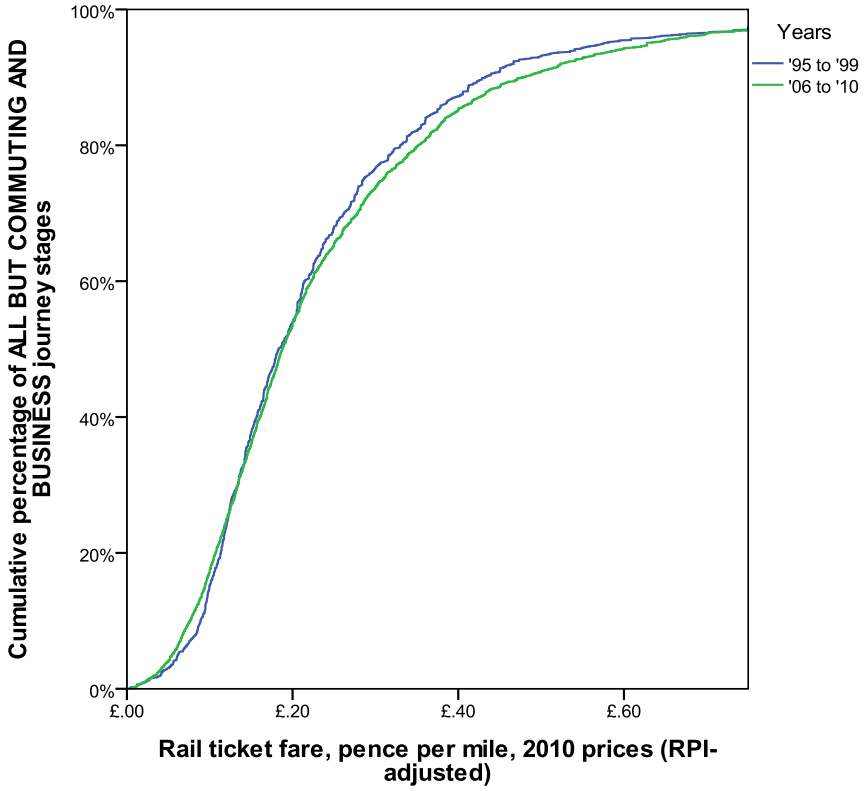
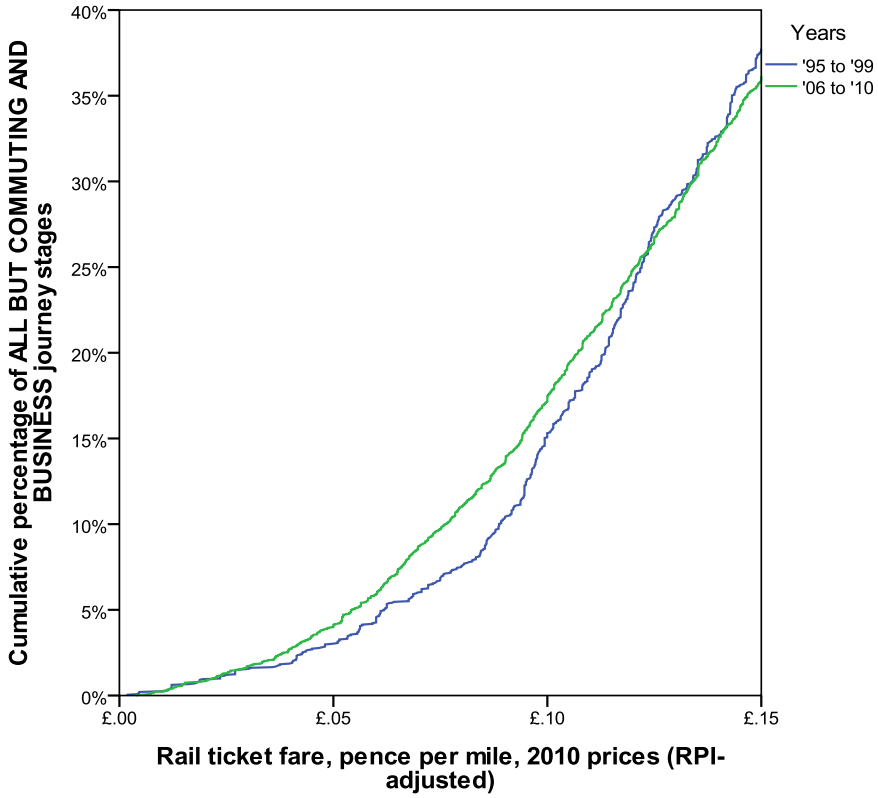


Figure 23: Cumulative distribution of National Rail fares for all but commuting and business purposes, bottom of distribution magnified



8. Journey Purposes

This section looks at changes in the number of journeys made during NTS respondents' diary weeks for various purposes.

The data is weighted at the NTS-respondent level, but not with the NTS' journey-level weights; this is so that the number of journeys per week is an integer for each person, thus allowing the visual presentation of results shown here.

Results are shown for adults and children separately; further detailed breakdowns by age and gender are available on request from the authors.

Detailed definitions of journey purposes can be found in the NTS documentation.

The rest of this section briefly describes what the results show – it should be stressed that this is an exploratory analysis; the findings require more in-depth research to properly understand the changing trends and what may be causing them.

As discussed in Section 4, there has been a falling number of commuting journeys per person over time, which is also evident from Figure 24. The biggest drop seems to be in the proportion of people making six or more journeys to work activities.

The NTS did not distinguish between food shopping and non-food shopping before 1998, which can be seen in both Figure 27 and Figure 28. Figure 27 shows an especially marked fall over time in the proportion of people making six or more trips to food stores. There is a step change in the number of food shopping trips per child; this appears to be due to simply recharacteristing some trips to food stores by children after the change of NTS contractor in 2002 from trips for 'food shopping' purposes to trips for 'escort to shopping/personal business' purposes (see Figure 44). By contrast, the fall in non-food-shopping trips by children appears to be genuine as it is essentially a year-on-year fall from 2000 onwards. This last result is certainly ripe for further enquiry to better understand why this has happened and whether it is likely to continue.

Figure 29 shows an increasing number of trips to medical-related activities over time, which further analysis showed to be especially concentrated amongst people aged 70+.

Figure 30 shows that the number of people who record making trips to eat/drink alone is very small, and much smaller than the number who record journeys to eat/drink together with friends/relatives (see Figure 32). Figure 32 also shows that journeys to eat/drink with friends/relatives increased in the mid- to late-1990s, and has since been more stable.

Figure 31 shows that trips to unspecified 'personal business' activities have been generally stable over time.

In Figure 33 it can be seen that the number of trips by adults to visit friends/relatives at private homes has been trending downwards over time, an effect which seems predominantly due to a falling number of people who make many trips (four or more per week) to visit friends/relatives at home. This trend has also been concentrated amongst younger adults (as shown in Figure 34), and particularly for younger men the fall has been disproportionately at weekends (also shown in Figure 34).

Figure 35 shows that there has been a countervailing increase (at least until the 2007+ recession) in the number of trips made for other social purposes, but that this increase is a much smaller magnitude than the fall in visiting friends/relatives at homes. Figure 36 shows a similar result for entertainment/public activities, which is clearer for children than adults, but again not very large. Thus there does not seem to be one-for-one substitution of not-in-homes socialising to compensate for the fall in in-homes socialising.

In Figure 37 it can be seen that, unsurprisingly, children generally make more trips to participate in sport than adults do.

Figure 38Figure 37 shows an upward trend in the number of trips to holiday-destination-bases (i.e. residences such as hotel rooms or cottages where one stays whilst on holiday).

Figure 39 shows that in recent years NTS respondents are reporting more journeys in the 'day trip/just walk' category, particularly children.

Figure 40 shows that NTS respondents report very few journeys for non-escort purposes that are classified as 'other' than the previously-listed purposes.

The remaining figures (Figure 41 to Figure 45) relate to escort travel – in all cases these are minority activities, with well fewer than 50% of people (either children or adults) performing any one of these classes of escorting journeys. Several apparent artefacts due to the change of NTS contractor in 2002 can be seen – e.g. the jump in 'escort other' travel from 2002 onwards.

Figure 24: Percentage of children and adults by number of journeys to work activities during NTS diary week

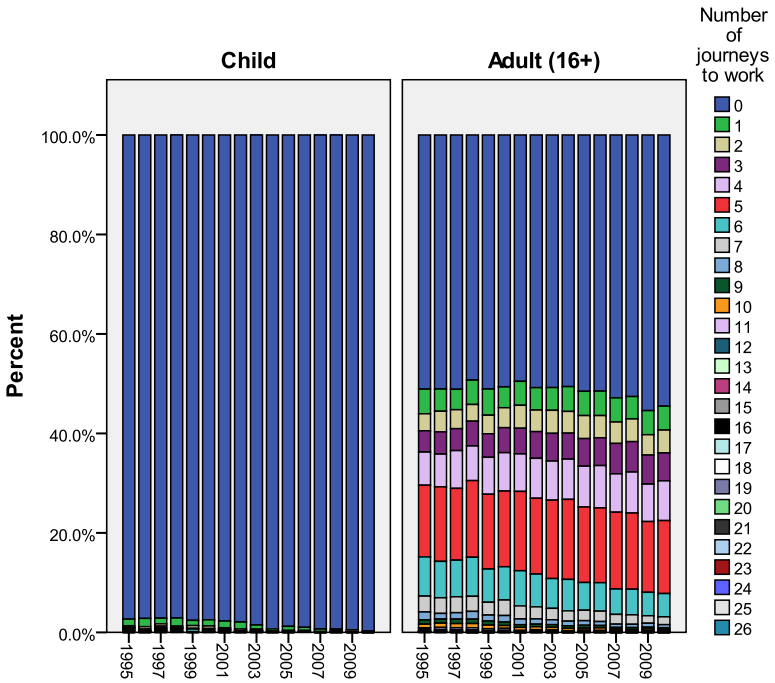


Figure 25: Percentage of children and adults by number of journeys in the course of work activities during NTS diary week

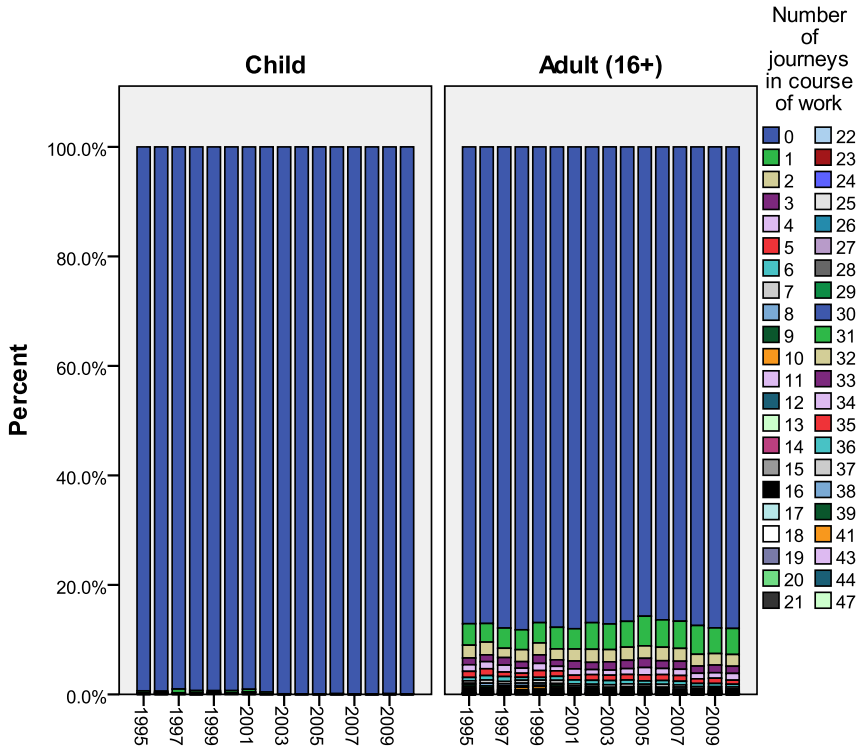


Figure 26: Percentage of children and adults by number of journeys to education activities during NTS diary week

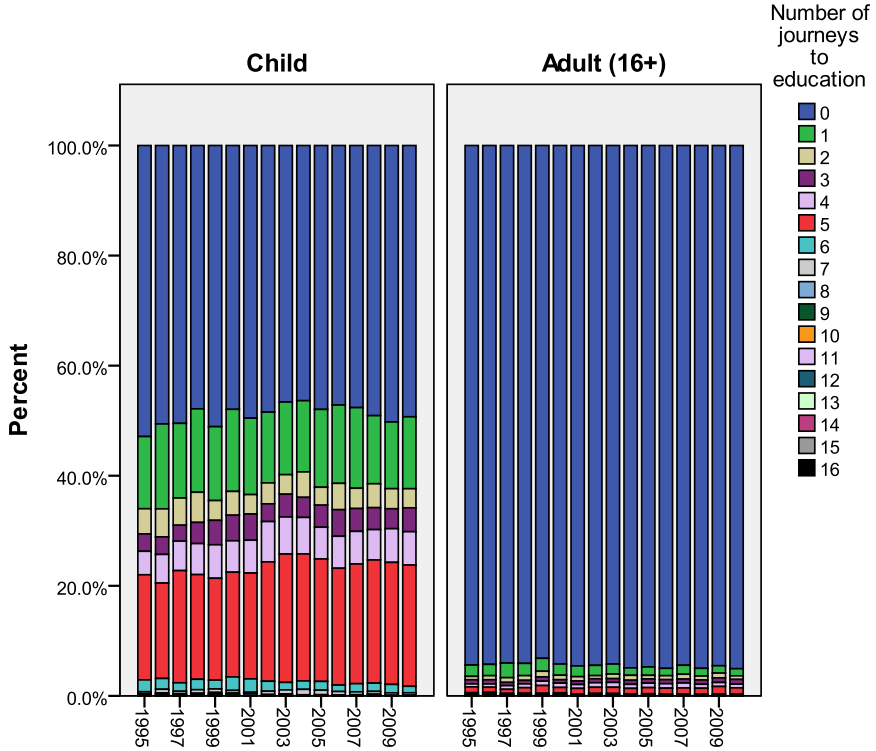


Figure 27: Percentage of children and adults by number of journeys to food shopping activities during NTS diary week

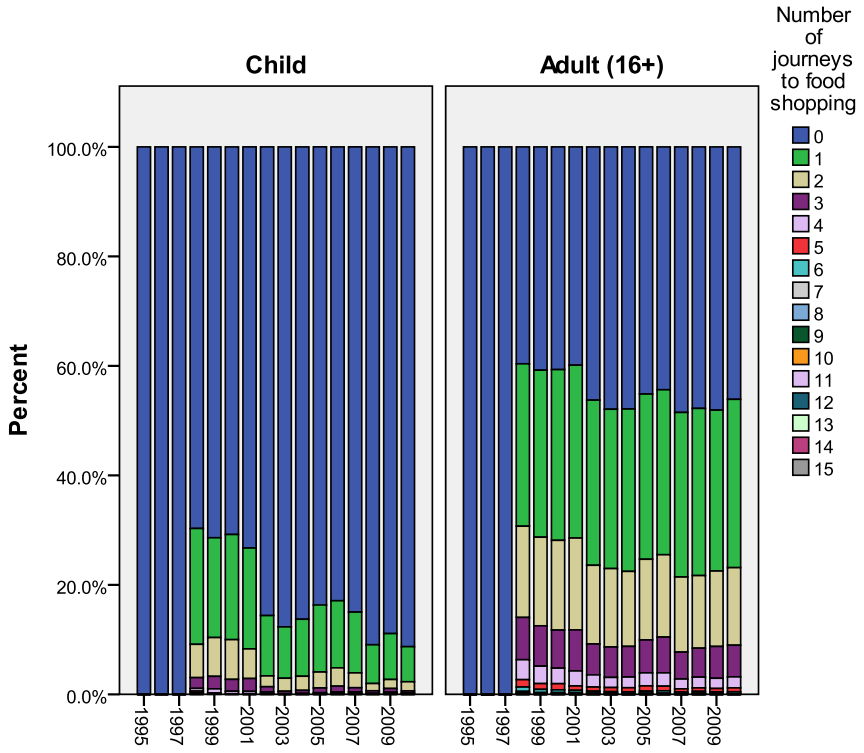


Figure 28: Percentage of children and adults by number of journeys to non-food shopping activities during NTS diary week

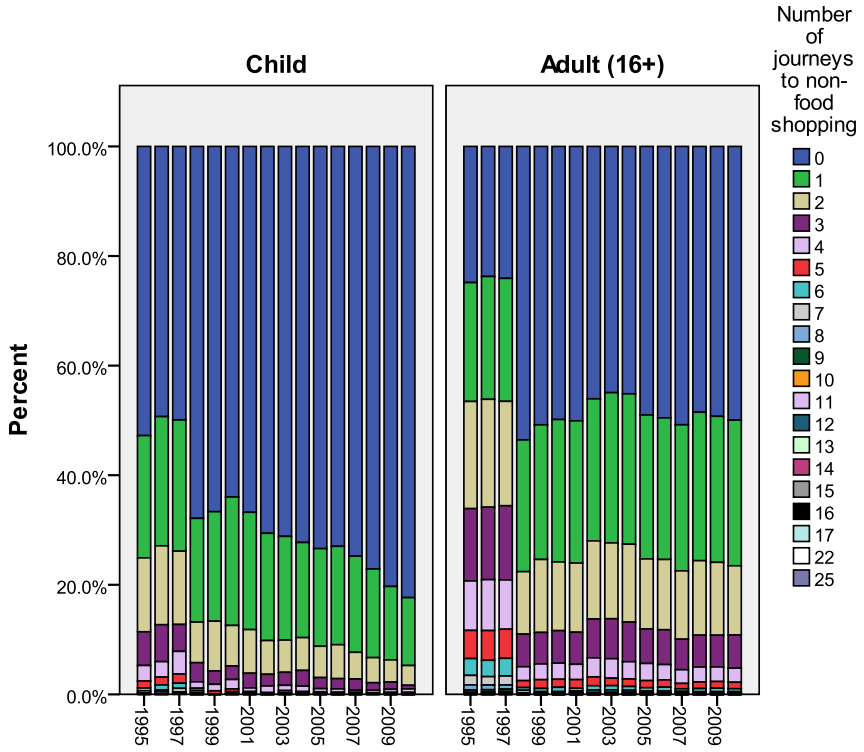


Figure 29: Percentage of children and adults by number of journeys to medical activities during NTS diary week

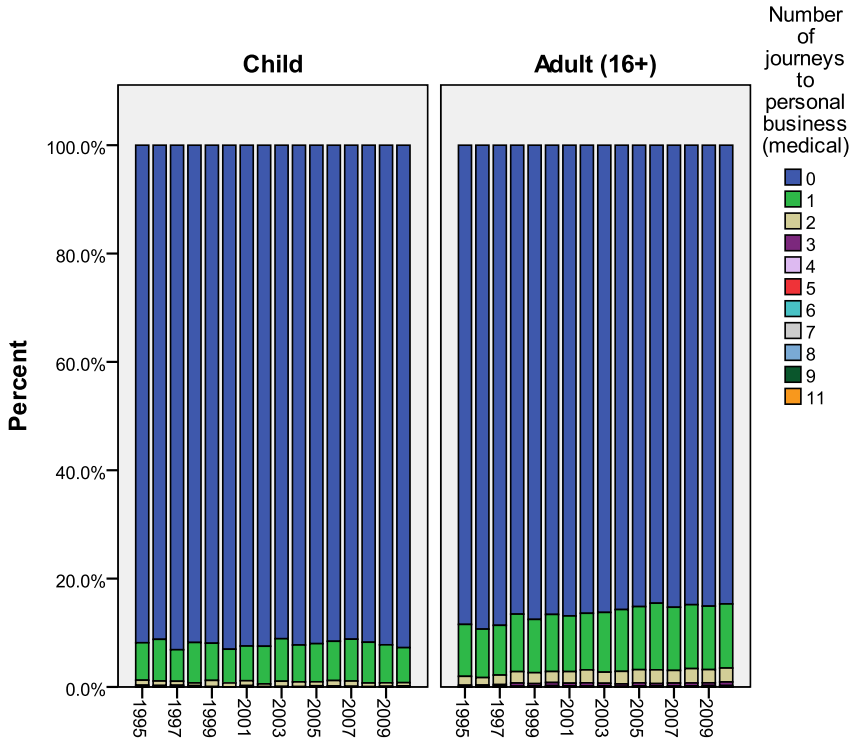


Figure 30: Percentage of children and adults by number of journeys to eat/drink alone activities during NTS diary week

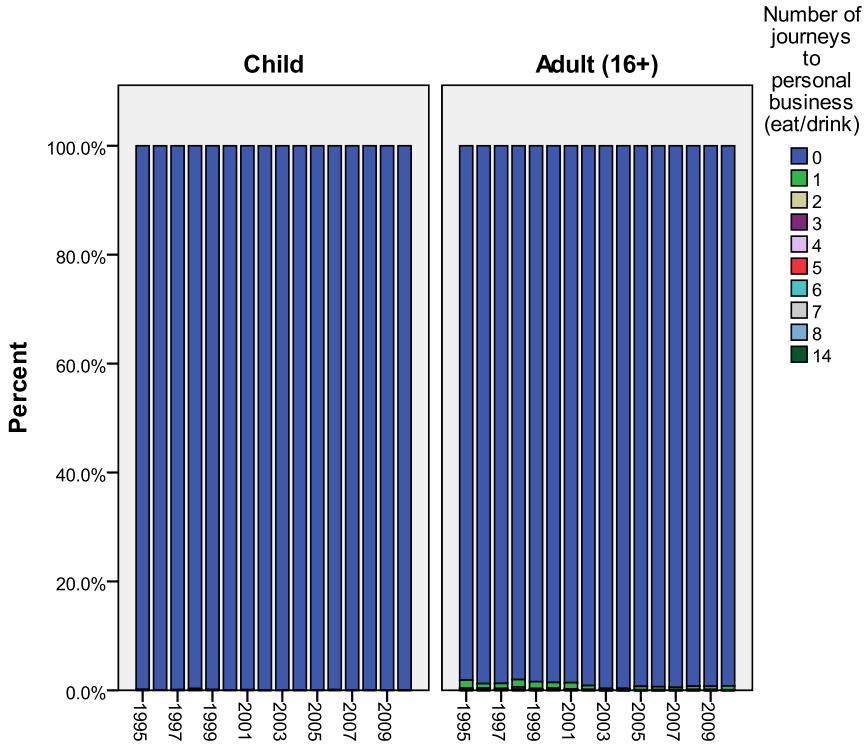


Figure 31: Percentage of children and adults by number of journeys to other personal business activities during NTS diary week

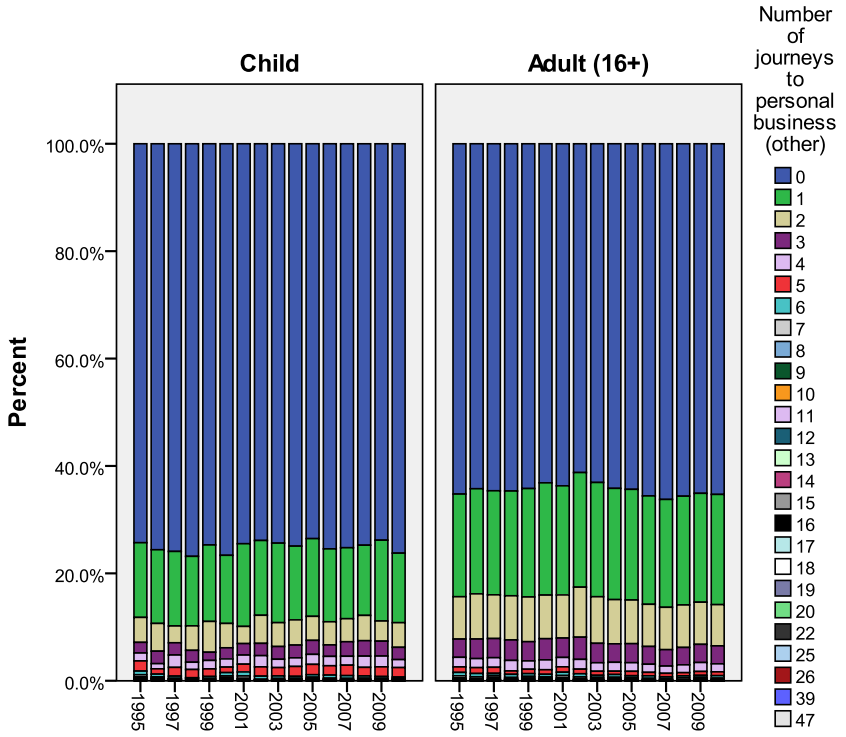


Figure 32: Percentage of children and adults by number of journeys to eat/drink with friends/relatives activities during NTS diary week

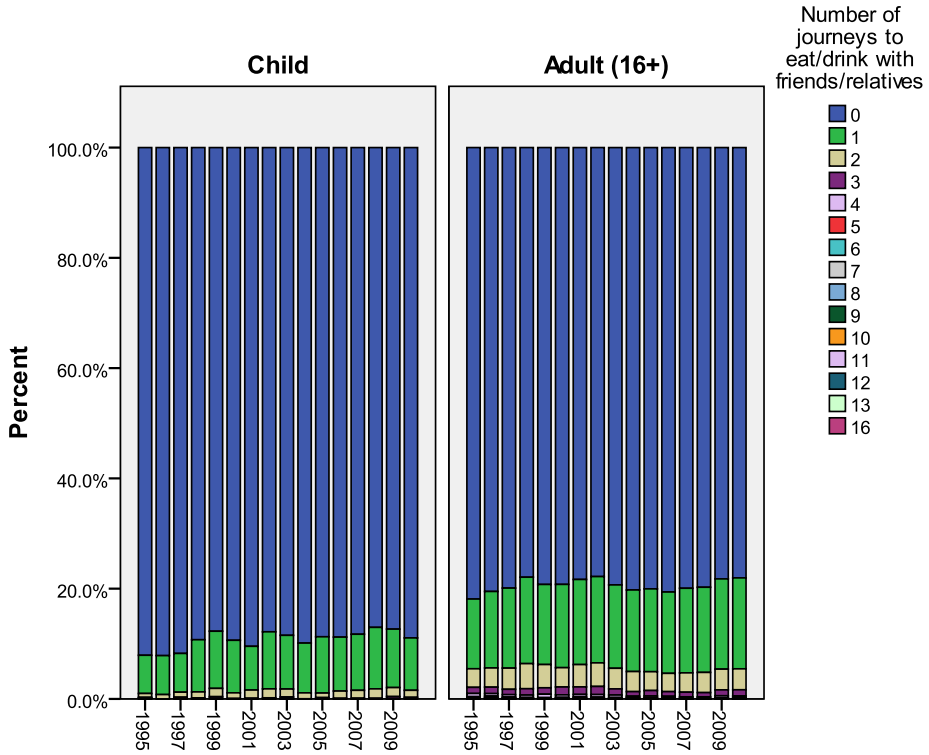


Figure 33: Percentage of children and adults by number of journeys to visit friends/relatives at private home activities during NTS diary week

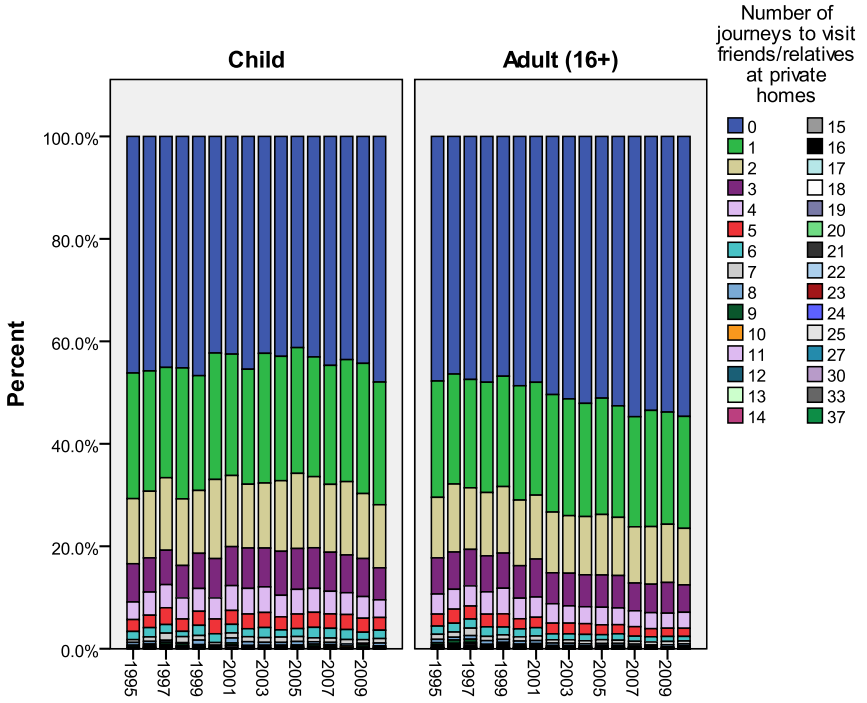


Figure 34: Number of journeys to visit friends/relatives at private homes, by day-of-week, gender and age

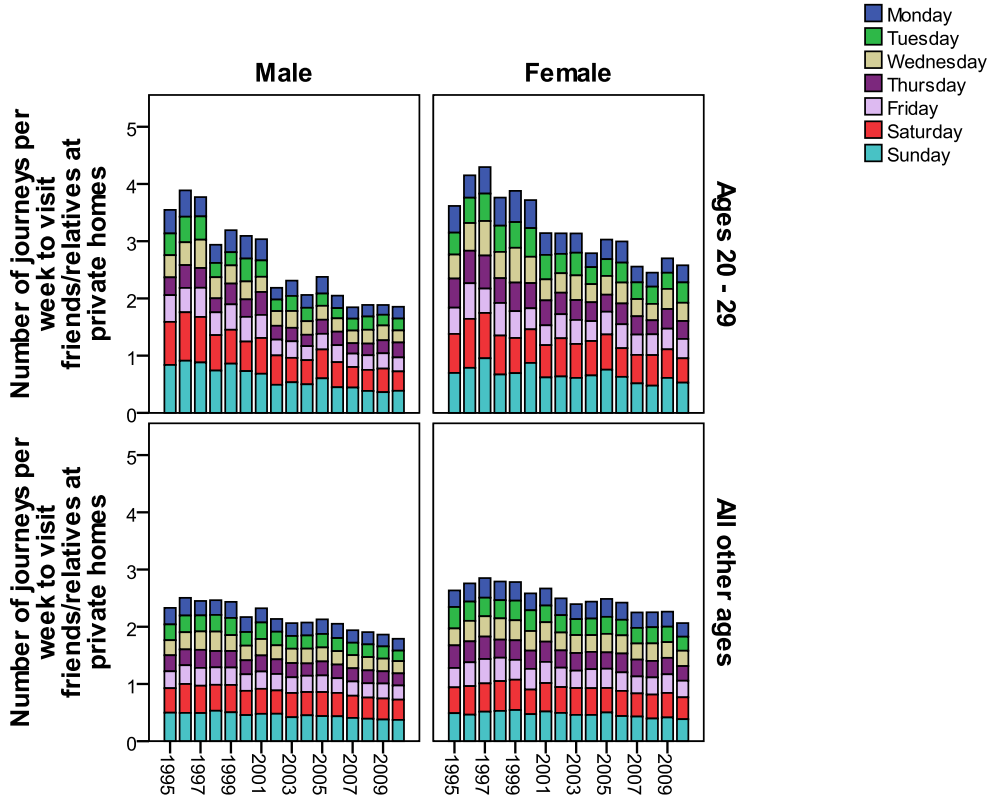


Figure 35: Percentage of children and adults by number of journeys to other social activities during NTS diary week

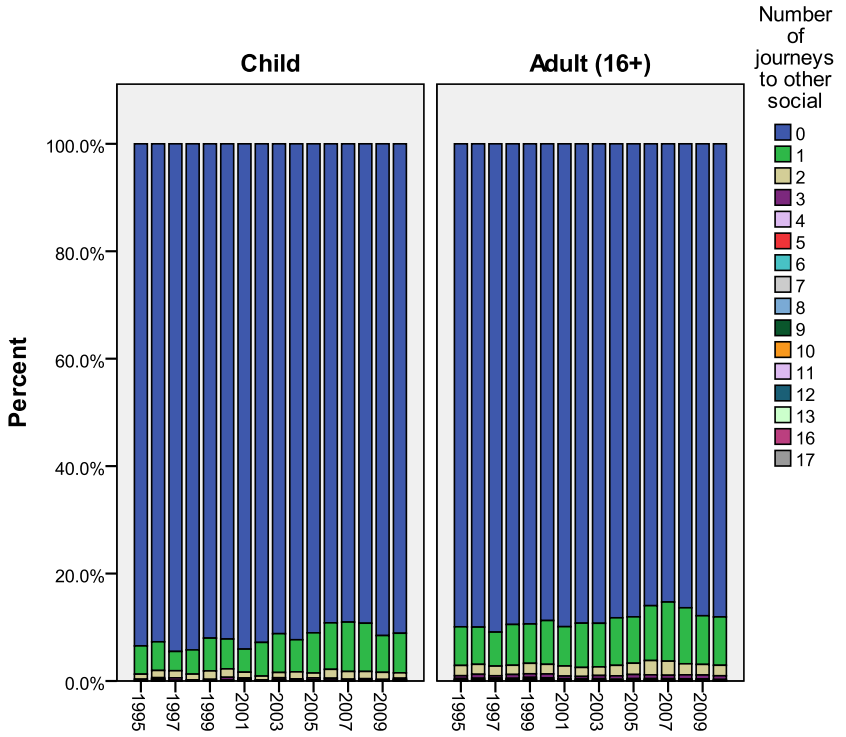


Figure 36: Percentage of children and adults by number of journeys to entertainment/public activities during NTS diary week

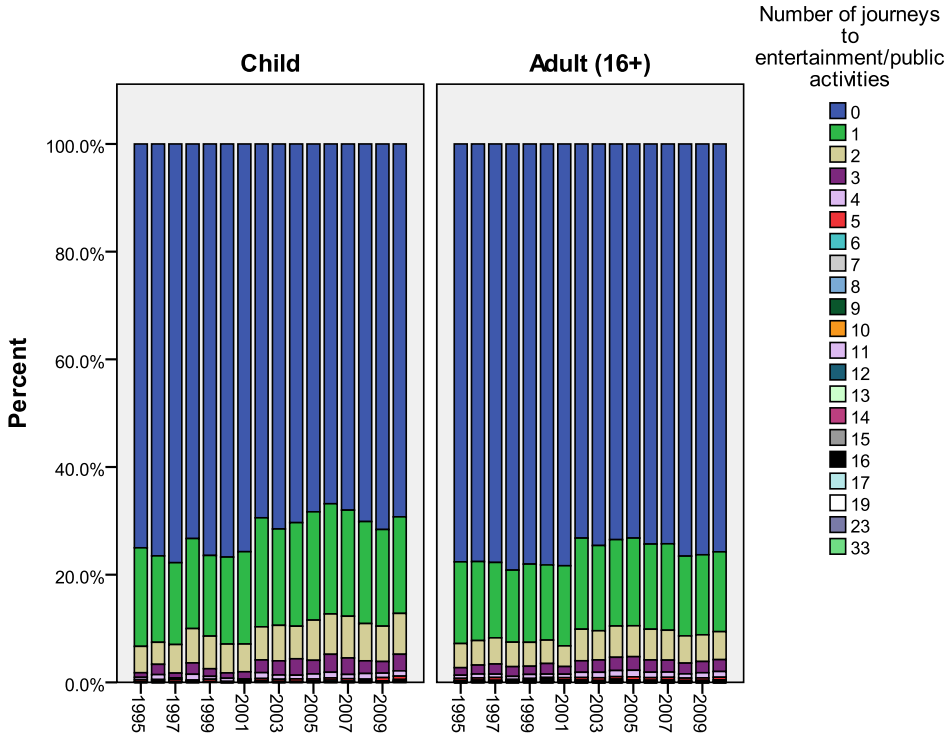


Figure 37: Percentage of children and adults by number of journeys to participate-in-sport activities during NTS diary week

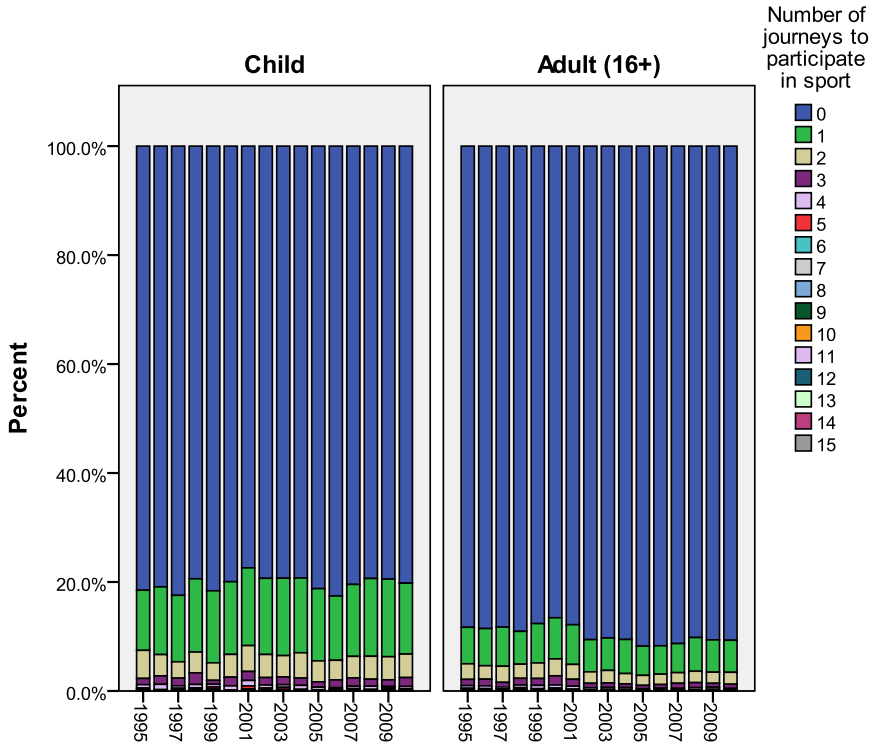


Figure 38: Percentage of children and adults by number of journeys to holiday-destination-base activities during NTS diary week

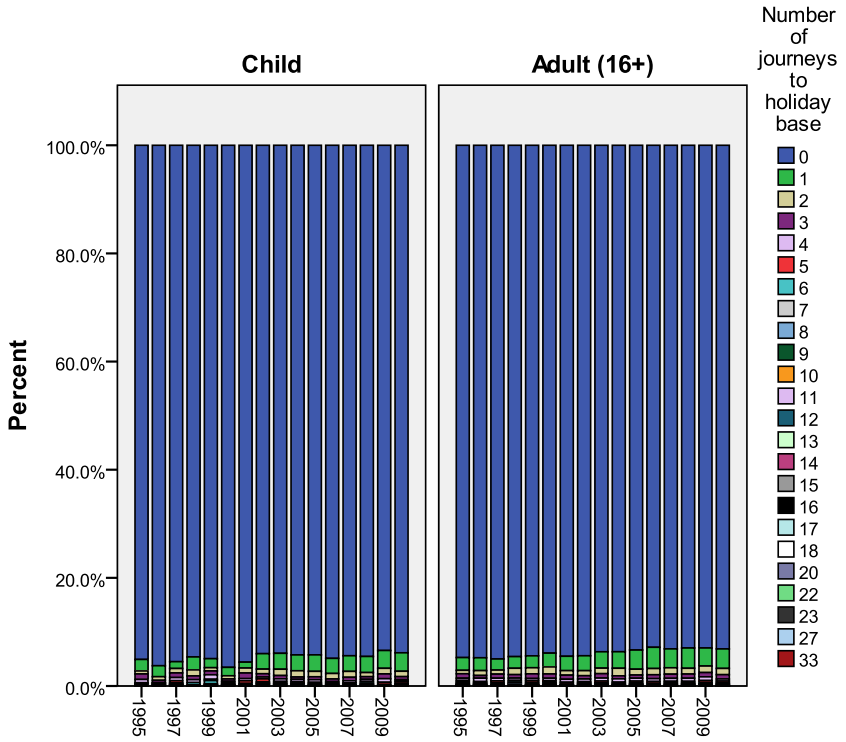


Figure 39: Percentage of children and adults by number of journeys to day trip/just walk activities during NTS diary week

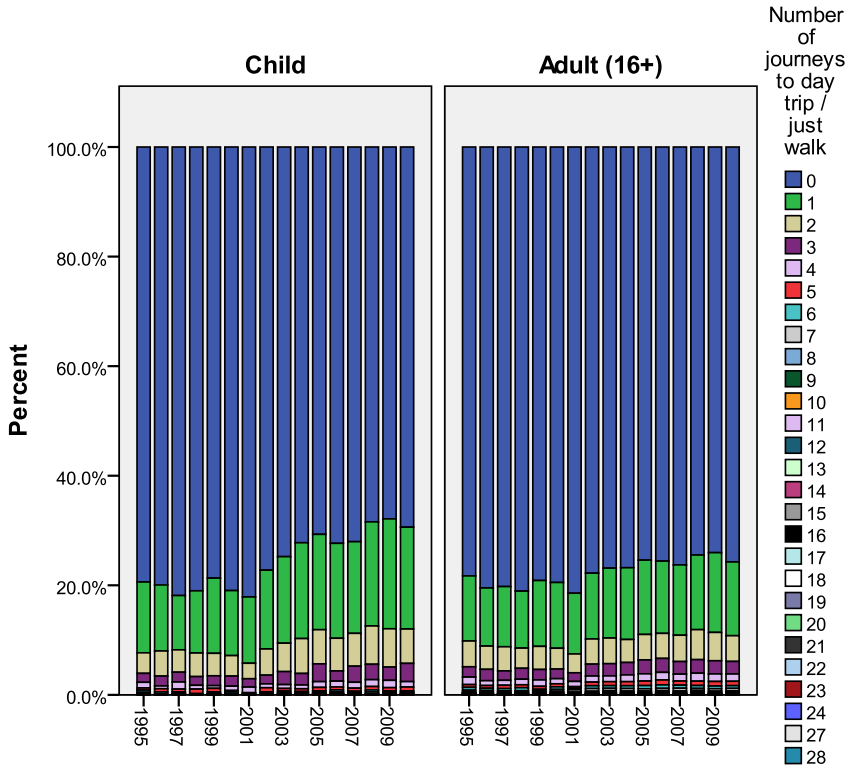


Figure 40: Percentage of children and adults by number of journeys to other non-escort activities during NTS diary week

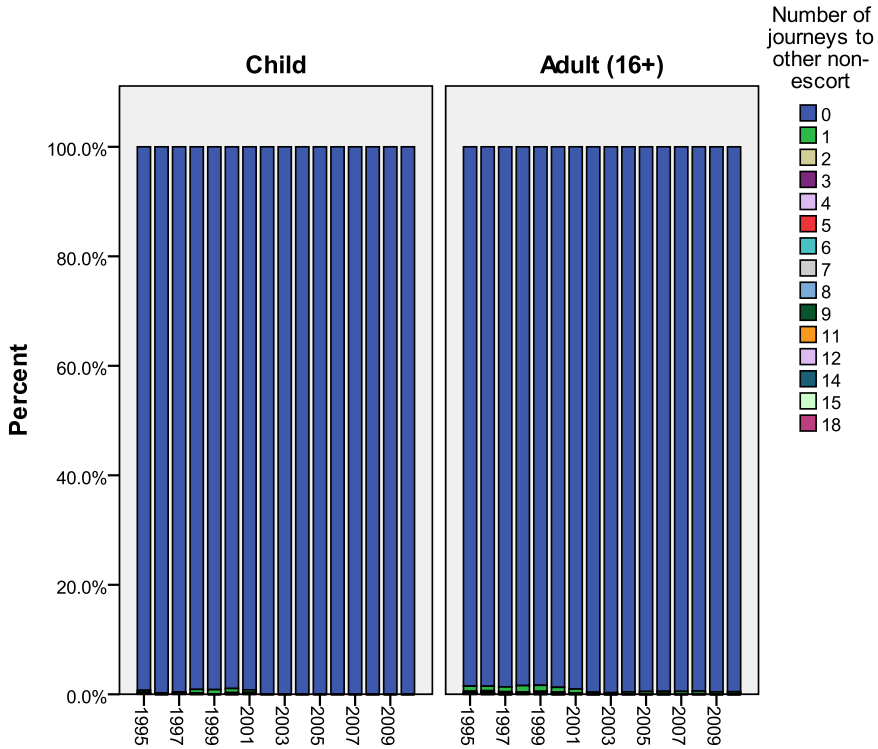


Figure 41: Percentage of children and adults by number of journeys to escort-to-work activities during NTS diary week

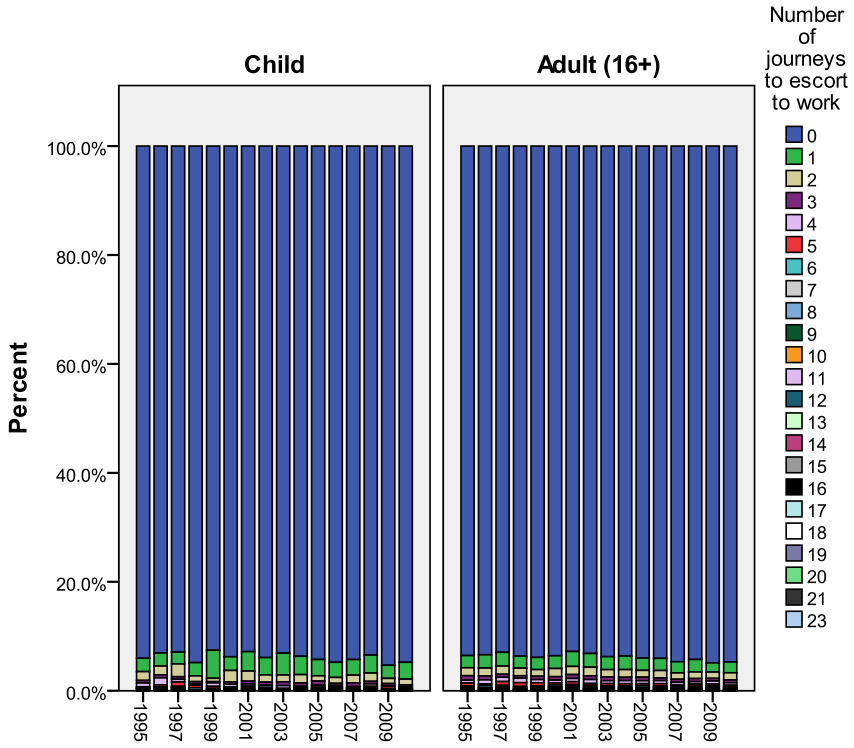


Figure 42: Percentage of children and adults by number of journeys to escort in course of work activities during NTS diary week

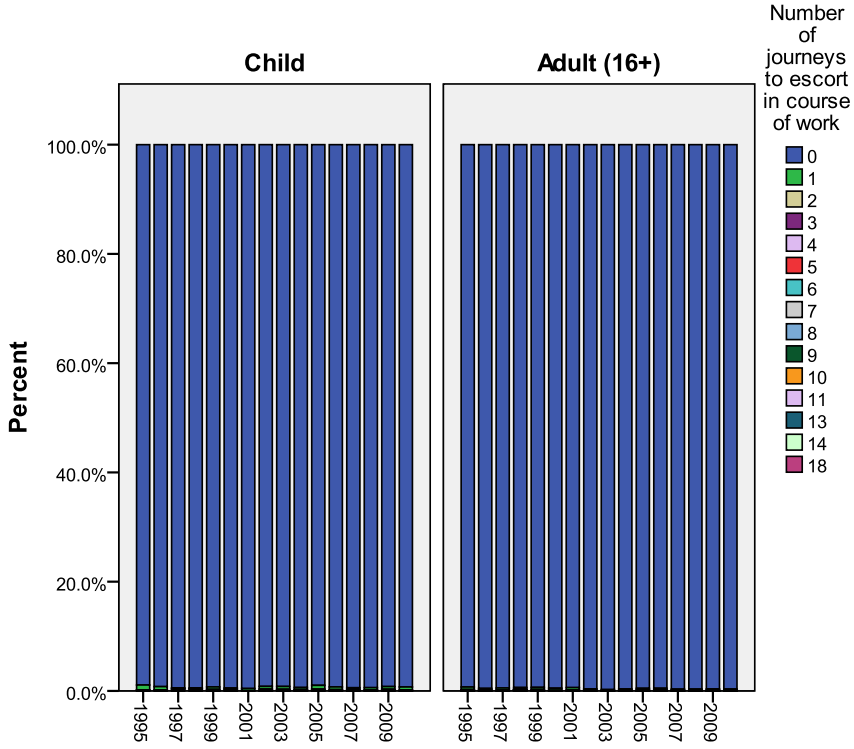


Figure 43: Percentage of children and adults by number of journeys to escort-to-education activities during NTS diary week

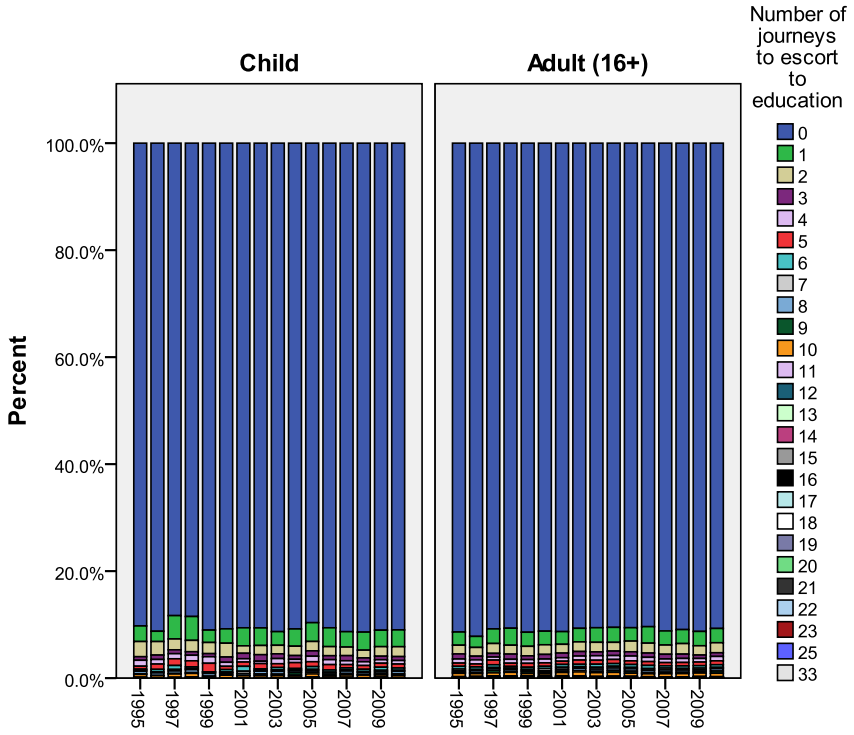


Figure 44: Percentage of children and adults by number of journeys to escort to shopping/personal business activities during NTS diary week

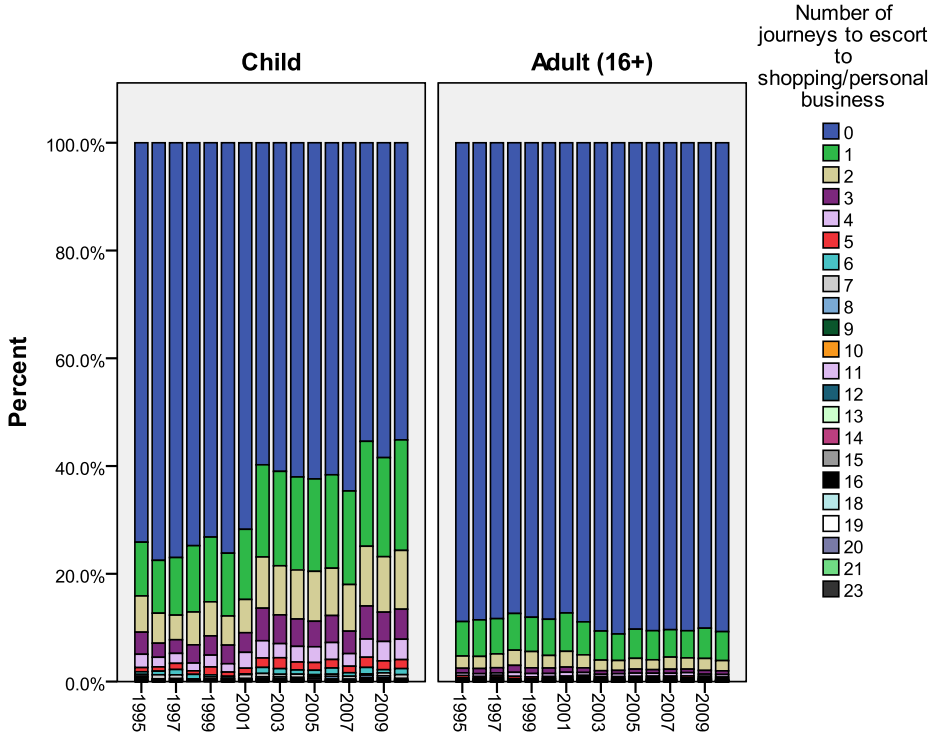
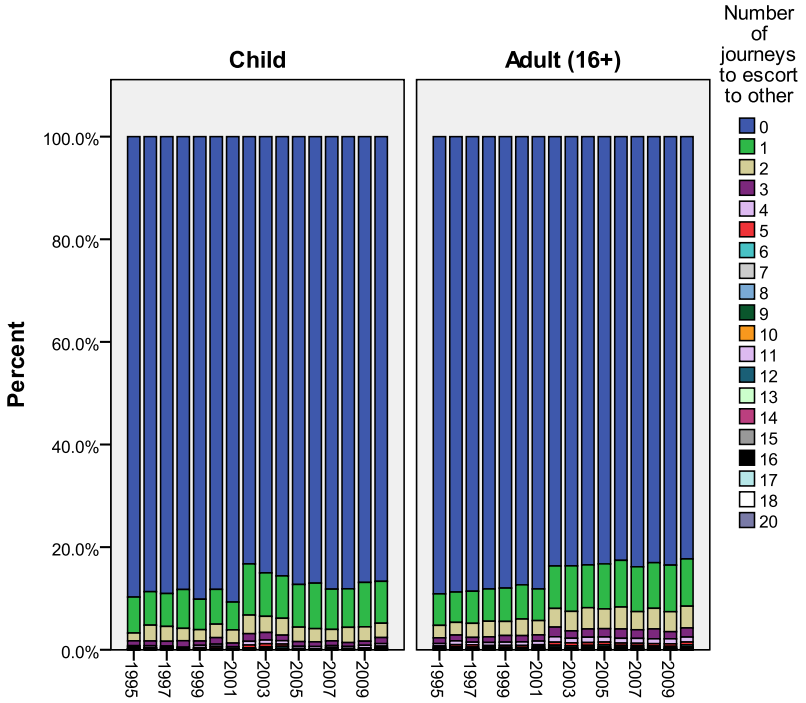


Figure 45: Percentage of children and adults by number of journeys to escort-to-other activities during NTS diary week



Contents

1. Introduction

This document is a Technical Compendium of analyses of Britain's National Travel Survey (NTS) that complements and extends the material covered in the study *On the Move: Making sense of car and train travel trends in Britain*. It documents and puts into the public domain research that was performed on the study but not covered in the report.

It is published as a web-only version, and is made freely available on the four sponsors' websites (RAC Foundation, Office of Rail Regulation, Independent Transport Commission and Transport Scotland).

Details on the use of the NTS data are available in *On the Move*. It is noted that many of the results in this Technical Compendium are presented in analyses at an annual timescale, rather than in three three-year groupings (1995/7, 2000/2, 2005/7) as in *On the Move*.

It should be noted that these analyses are exploratory, and many will require further research with more sophisticated techniques or additional data sources to better understand what is causing the observed trends.

This document is organised into sections, each of which covers a particular topic area.

A selection of the key points follows:

Section 2: At the regional level, car driving travel correlates closely with car passenger travel. There has also been a sharper fall in car driving amongst men living with a woman having a driving licence than amongst men living without a woman having a driving licence in their household. This appears to be largely due to changes in company car use rather than a shift from car driving to car passenger travel.

Section 3: There are established reasons that driving mileage per capita estimates vary between the NTS and road traffic counts – but this difference has been growing over time, particularly amongst light vans. It is unclear what is causing this.

Section 4: Workers have been making fewer commuting journeys. The evidence suggests a modest but statistically significant link between a crude indicator of telecommunications usage and working at home.

Section 5: Car driving mileage increases during the working week from Monday to Friday. The percentage of rail travel taking place at weekends seems to have increased over time.

Section 6: Young people who do not drive cite a variety of reasons for this; of those saying that costs deter them they are more likely to say the costs of learning rather than the cost of purchasing a car, insurance, or general motoring costs. After accounting for age, income and other demographics, there is a strong link between being born outside of the UK and not having a driving licence.

Section 7: There is some evidence of 'yield management' practices in the rail industry leading to more low-cost rail tickets being sold, but this is not the case for commuting and business rail travel markets.

Section 8: Travel to visit friends and relatives at private homes has fallen over time. This is most pronounced amongst young people, and in the case of men the fall has taken place disproportionately at weekends.

2. Car Passenger Travel

The car occupancy rate (the number of people per car, including the driver) has remained in a narrow band between 1.5 and 1.6 throughout the period from 1995 to 2010.

It can be seen in Figure 1 that, as with car driving mileage, there is a clear relationship between car passenger mileage and settlement size – the average rural resident travels for a much greater distance as a car passenger than does the average Londoner, which is at the opposite end of the settlement size spectrum.

Figure 2 also shows that London has been somewhat unique amongst the regions of Great Britain, in that car passenger travel by Londoners has consistently trended downwards, a trend which is not found for other regions of Great Britain.

In Figure 3 it can be seen that at the regional level there is a quite close link between average car driving and car passenger mileage, with average driving mileage being between 60% and 98% greater in all regions of Great Britain. (A regression line drawn through this plot would have an r^2 value of 0.95.)

Figure 1: Car passenger mileage per person per year, by settlement size

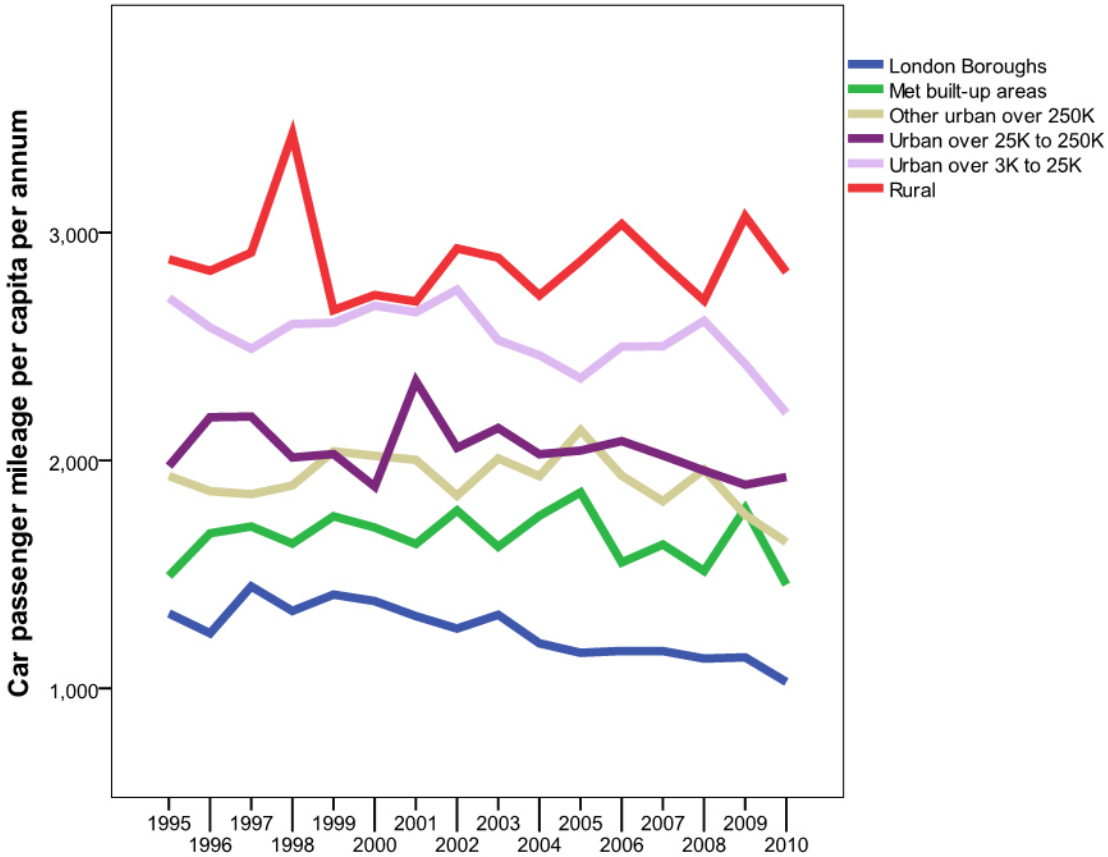


Figure 2: Car passenger mileage per person per year, by region of GB

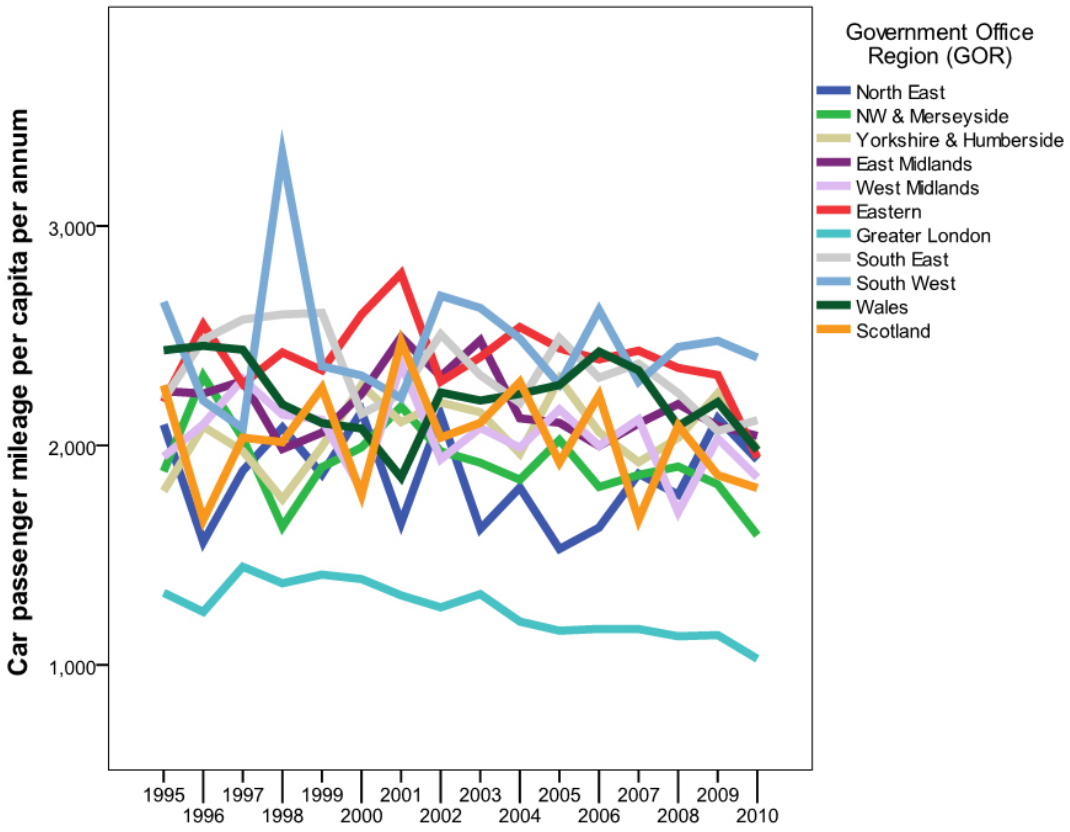
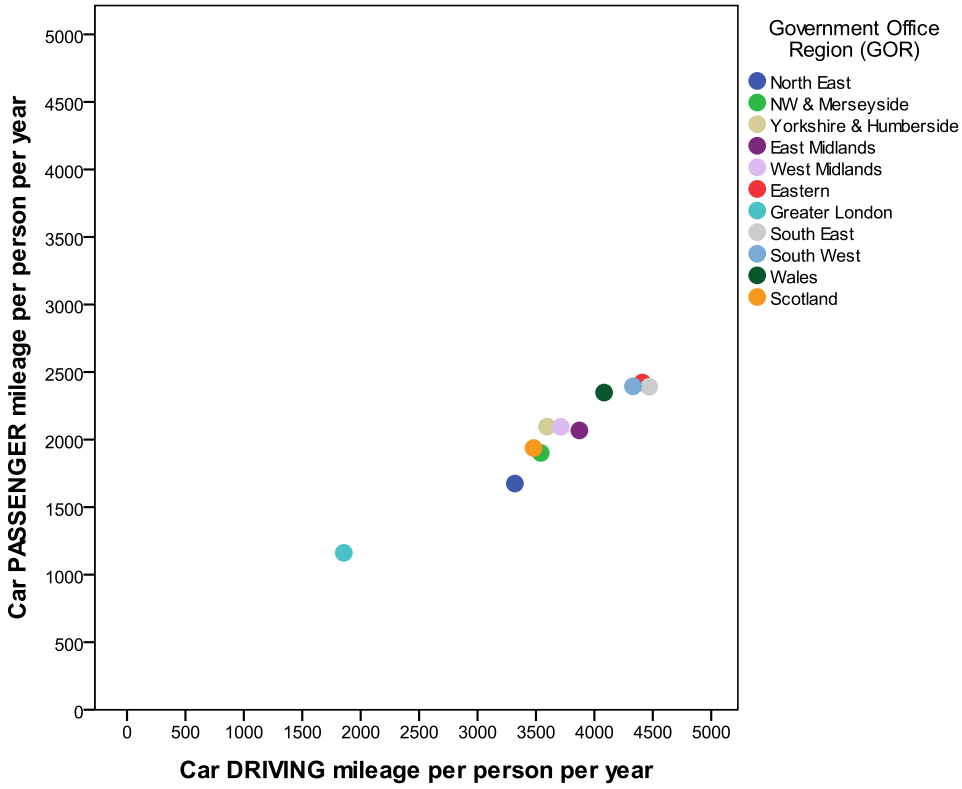


Figure 3: Car driving and car passenger mileage per person per year by region of GB, 2005/7

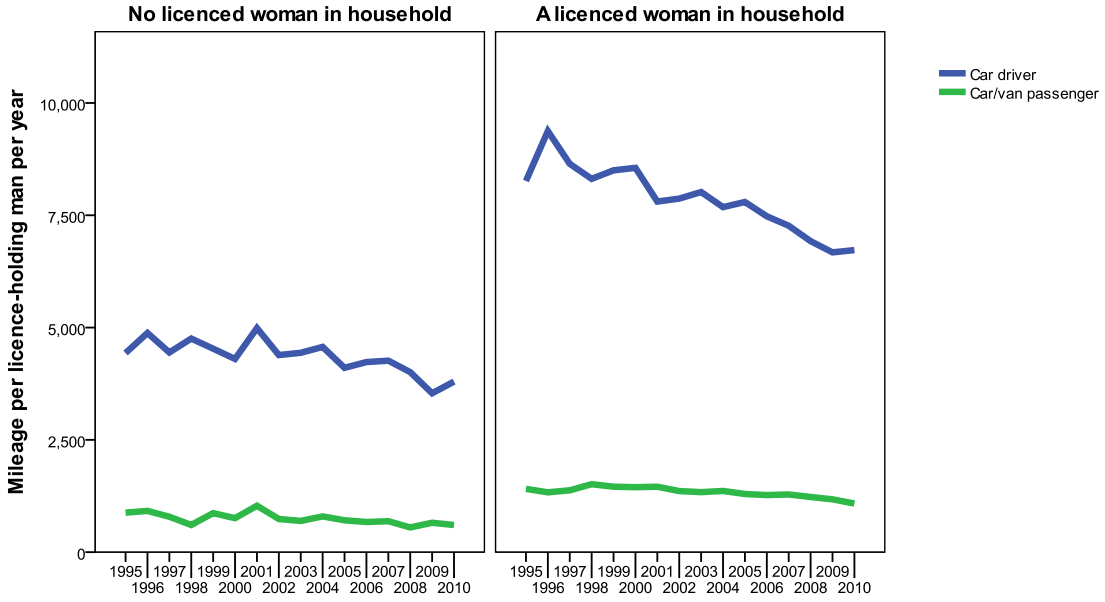


An intriguing result was turned up early in this study: when men are broken into two groups – those living with at least one driving-licence-holding woman in their household and those not – both of these two groups saw their diving mileage fall over time. But the group living with licence-holding women saw their driving mileage fall at a much faster rate. This result was found to be robust when investigated for all men as well as for only licence-holding men, as shown in Figure 4.

This raised the question: could car driving travel by these men simply be transferring to car passenger travel where they are being driven by the licence-holding women they live with?

Figure 4 shows however that this differential decrease of car driving mileage is not attributable to growing car passenger travel: apparently men living with licence-holding women have seen their car driving fall at a fast rate and from a high level, but this is not showing up in the form of them travelling more as car passengers.

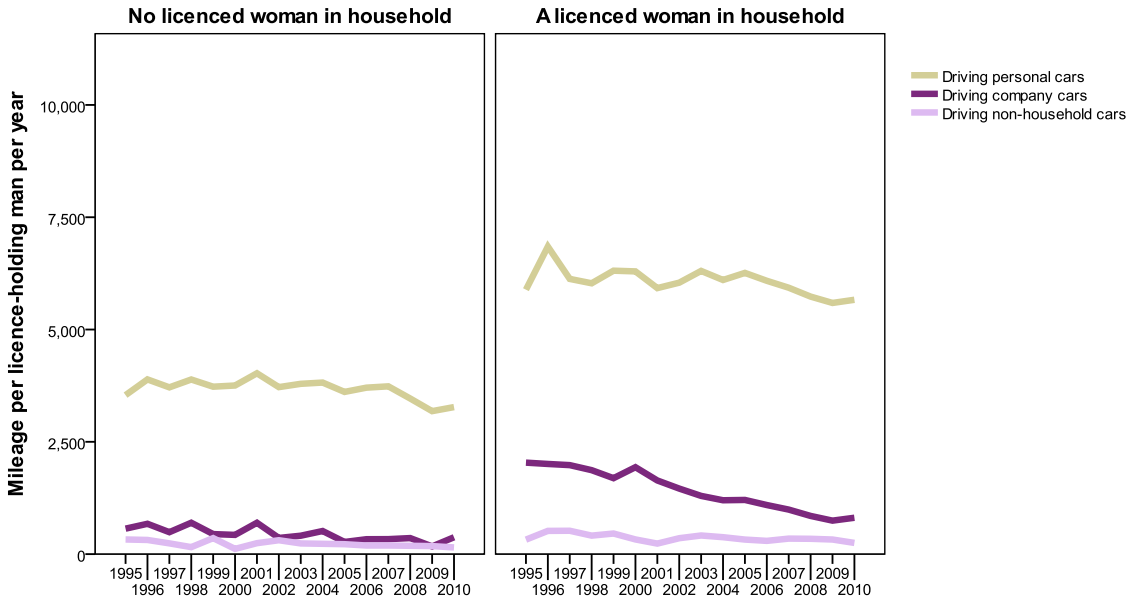
Figure 4: Car mileage per year by licence-holding men, by car driver/passenger and presence/absence of at least one licence-holding woman in household



On further study, the effect seems to be due primarily to a fall in company car use. In the mid-1990s company car driving was much higher amongst (licence-holding) men living with licence-holding women, and it has fallen sharply since then.

Interestingly, ***personal*** car travel has been much more stable for both men living with and without licence-holding women; nearly all the fall in their driving mileage (and the changing differences between the groups) is linked with company car use.

Figure 5: Car driving mileage per year by licence-holding men, by ownership type of car driven and presence/absence of at least one licence-holding woman in household


No licenced woman in household
A licenced woman in household
Mileage per licence-holding man per year
10,000
7,500
5,000
2,500
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Driving personal cars
Driving company cars
Driving non-household cars

3. Traffic Counts

It is well established that there are differences between estimates of per-capita car driving when measured by the NTS and the Road Traffic Estimates (RTEs), which are based on a continuous programme of automatic and manual traffic counts undertaken by the Department for Transport.

The RTEs yield higher estimates of per-capita driving, which are generally attributed to methodological differences. The NTS, for instance, explicitly excludes some travel, notably certain types of travel as part of one's job. A courier delivering a parcel would not report in their NTS diary their driving for work, but this mileage would in principle be eligible to be counted in the RTEs. There are a number of other notable differences: the NTS covers only British residents, so excludes all travel by visitors from abroad. The NTS and RTEs are also both based on sampling procedures, and in the case of the NTS it is known that response rates have drifted downwards over time.

While it is to be expected that the two data sources will yield different estimates, it is interesting that the differences seem to be growing over time. Figure 6 shows that for car driving mileage there has been an apparently growing gap between the NTS estimates and the RTEs. It is worth noting that in addition to the methodological differences noted above, there was a change of NTS contractor in 2002, and Figure 6 seems to show a step change in the 'gap' centred on 2002.

Figure 7 shows the same data as Figure 6, but for light vans instead of cars. Here the differences are striking: the RTEs show light van travel to have grown robustly right up to the 2007+ financial crisis, whilst the NTS shows falling levels of per-capita light van driving. In addition to the methodological differences noted previously, the definitions of 'light vans' are not identical in the NTS and RTEs. Nevertheless it is unexpected that they would yield such divergent trends, and further research will be needed to understand these results.

Figure 6: Car driving mileage per capita, National Travel Survey and Road Traffic Estimates, and the difference

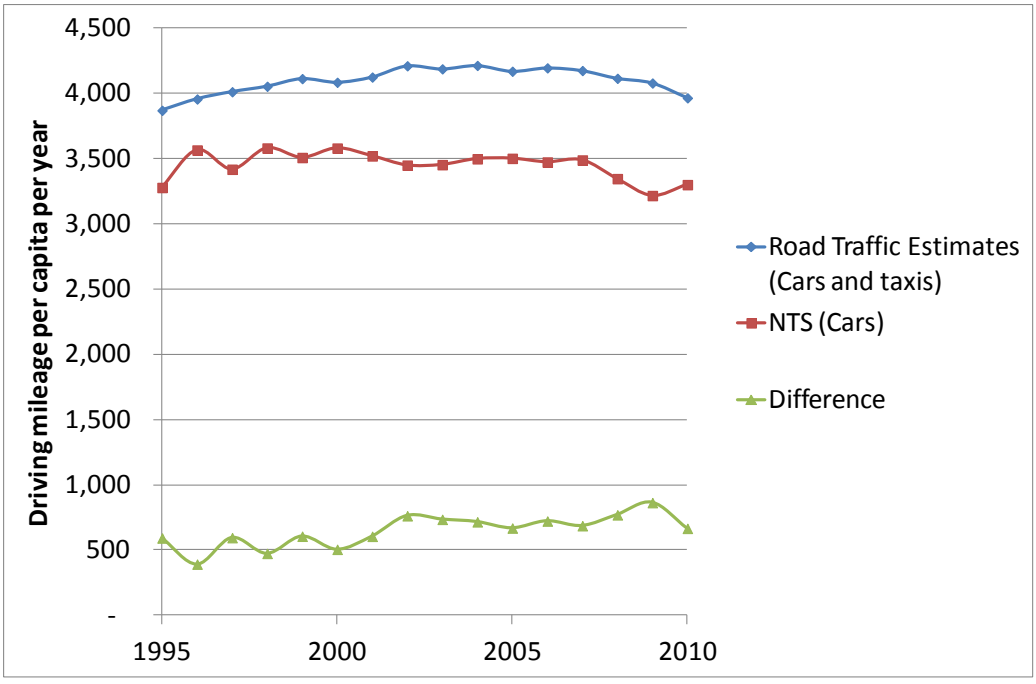
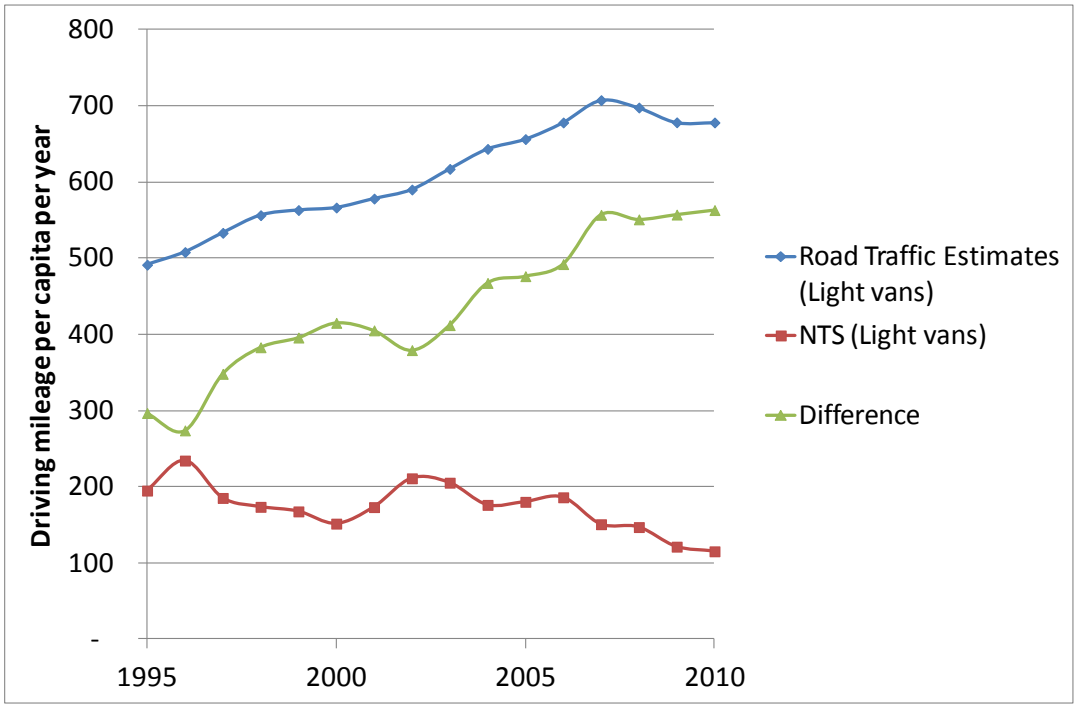


Figure 7: Car driving mileage per capita, National travel Survey and Road Traffic Estimates, and the difference



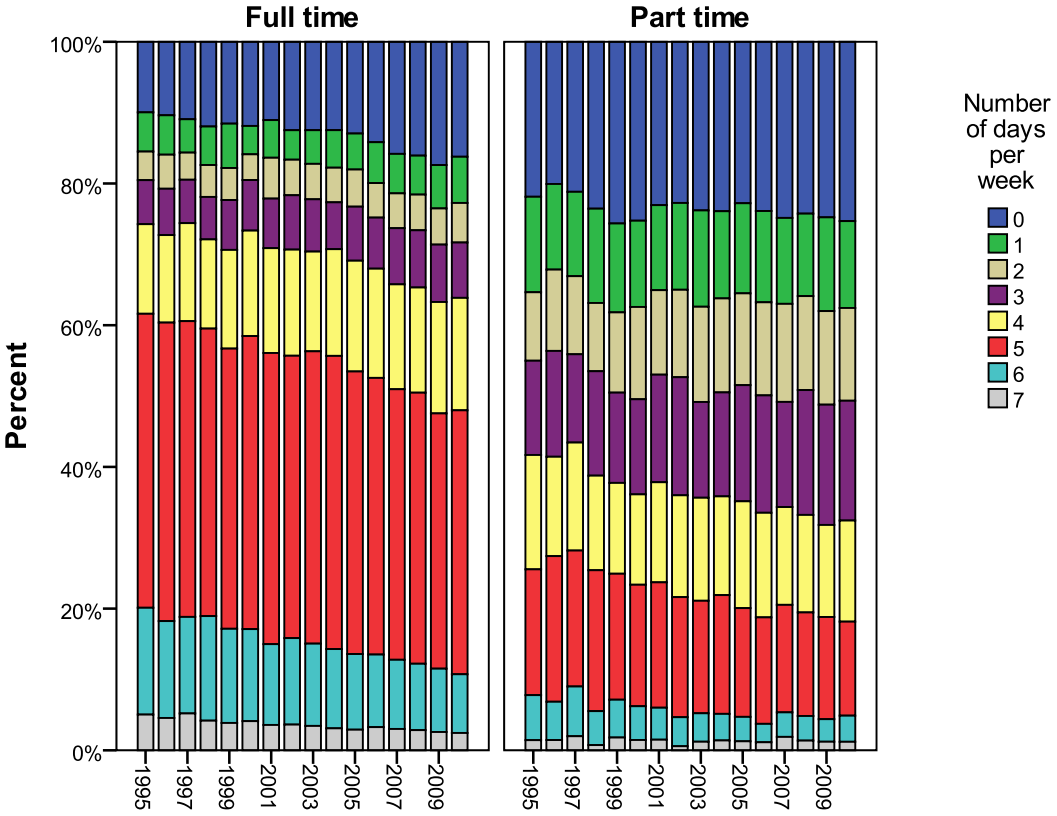
4. Working Practices

It has been observed that the number of commuting journeys and commuting mileage per capita have been trending downwards in recent years, whilst average commute lengths have not fallen. This section describes a set of analyses designed to yield insights into these changes in patterns of work travel.

As the NTS data contains a fairly complete record of journeys undertaken for work purposes by each NTS respondent during their diary week, it was processed to yield for each respondent the number of days on which they reported making at least one work-related journey.[1] This was assessed together with the NTS respondents' self-reports of whether they work full time, part time, or not at all.

When this was analysed, it was found that – mainly for full-time workers – the number of working days per week seems to have fallen over time, as can be seen in Figure 8. Somewhat surprisingly, it was found that the largest decreases were in the categories of full-time workers working six or seven days a week. For full-time workers, the prevalence of five-day-working weeks fell as well, but to a much smaller degree, and only in the period from 2004 onwards.

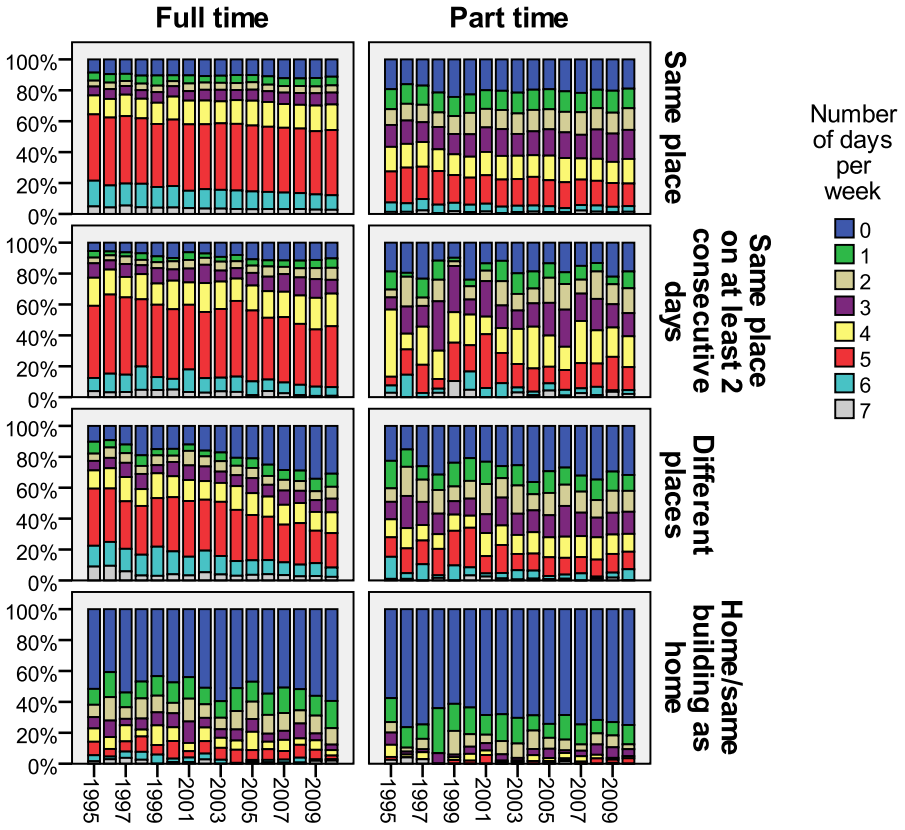
Figure 8: Percentage of full-time and part-time workers, by number of working days per week



[1] Any work-related journeys made on foot for less than ¼ mile are not recorded on days one to six of the NTS diary week. Certain types of work-related travel are also excluded from the NTS, as are all journeys partly or entirely outside of GB. For this analysis, work-related journeys include both commuting journeys (journeys made to/from a worker's usual place of work) and business journeys (made in the course of work).

One plausible explanation for this result is the growing prevalence of working at home: in 2002 8% of workers reported working at home either exclusively or more than once per week; this had risen to 11% by 2010. Figure 9 shows that when this analysis was rerun to account separately for people who work at home, however, the trend remained amongst people who do not work at home, and was strongest amongst people who report that they work at different places on different days.

Figure 9: Percentage of full-time and part-time workers by place of work, by number of working days per week



Note: All workers who do not go to the same workplace on at least 'two days running each week' are classified as working at 'different places'

Table 1 contains the results of two multivariate regression analyses: one where the number of days that each worker was seen to perform a work-related journey is the dependent variable, and a second where the dependent variable is the number of days per week that NTS respondents estimate that they typically work at home. The analysis includes only workers; non-workers are excluded. Only respondents to the NTS in years 2002, 2003, 2004 and 2008 are included. These are the only years that questions were asked in the NTS about the type of items that NTS respondents purchase online, via telephone or by post. What was collected are yes/no indicators of whether anyone in the responding household purchases each of the following items:

- Food and drink
- Clothes
- Books
- Furniture
- Travel
- Tickets (non-travel)

The regression made use of this variable as well as the others shown in Table 1.

Table 1: Results from linear regression analyses of number of days per week working out-of-home (centre column) and number of days working at home (right column), p-values in brackets

	n=39,555 r^2=0.08	n=39,555 r^2=0.04
	Dependent variable	
	# of days observed to undertake at least one work-related journey during NTS diary week	# of days in a typical week that respondent reports working at home, during NTS interview
Constant	2.94 (<0.01)	-0.193 (<0.01)
Year 2002	--	--
Year 2003	-0.0326 (0.28)	-0.0121 (0.41)
Year 2004	-0.0362 (0.23)	-0.0123 (0.40)
Year 2008	-0.217 (<0.01)	0.0300 (0.04)
Female	-0.217 (<0.01)	-0.00572 (0.61)
Age in years	-0.00296 (<0.01)	0.00952 (<0.01)
Personal income (£/year, 2010 prices)	2.46E-7 (0.71)	3.42E-6 (<0.01)
FT worker	1.21 (<0.01)	-0.145 (<0.01)
Socioeconomic group: Employer/manager	-0.236 (0.42)	0.591 (<0.01)
SEG: Professional	0.228 (<0.01)	-0.086 (<0.01)
SEG: Non-manual	-0.0444 (0.59)	0.491 (<0.01)
SEG: Personal service	0.266 (<0.01)	0.120 (<0.01)
SEG: Non-professional self-employed	0.035 (0.49)	0.0140 (0.57)
SEG: Manual	–	–
# of distinct items ordered for delivery by phone, internet or post by members of household	-0.0110 (0.11)	0.0280 (<0.01)
Frequency of deliveries per week for items ordered for delivery (all items combined)	-0.00202 (<0.01)	0.00274 (<0.01)

A number of the results from these regressions are of note, the first being that the goodness-of-fit for both models are small, which indicates that most of the variation in the number of working days is not being captured by these models. Also, as the dependent variables are in count form (0, 1, 2…7), the distributional assumptions for linear regression are not met and the results should be treated with some caution; an analysis using different distributional assumptions that are suitable for count data is needed in future.

In the 'NTS diary' analysis (of out-of-home working days) there is a *ceteris paribus* gender gap which implies that a woman is likely to travel to work roughly one fifth of a day per week less than an otherwise identical man. In the 'NTS interview' analysis

(of days working at home) no statistically significant effect due solely to gender is found.

In both analyses being an older worker is associated with a lower tendency to travel to work.

Higher personal income is positively associated with working at home in the 'NTS interview' analysis, but no significant effect due to income is found in the 'NTS diary' analysis. We may speculate that this is associated with greater flexibility as people advance in their career, though we can only suggest such a mechanism for this observed statistical association on the basis of this analysis, and in any case the effect suggesting this relationship is only significant in one of the two models.

Self-reporting as a full-time worker (as opposed to a part-time worker) is, not surprisingly, associated with travelling to out-of-home work-related activities for about 1.2 additional days per week in the 'NTS diary' analysis. It is also associated with working at home fewer days per week in the 'NTS interview' analysis.

An interesting result amongst the effects due to the type of work that one does is the effect due to being a professional worker (as opposed to the baseline of being a manual worker). The finding is that after accounting for income and the other effects in the analysis, the *ceteris paribus* effect of being a professional worker is that one is likely to travel to out-of-home work-related activities on more days per week (and likely to work at home on fewer days per week).

The final two results are particularly interesting – both of the indices for home delivery of goods (the breadth of items ordered as well as the frequency in which they are delivered) are negatively linked with the number of days working out-of-home (the 'breadth' variable at a p=0.11 significance level, however) and both at positively linked with the number of days that NTS respondents self-report that they work at home. (The effect of the 'breadth' variable is only significant at the p=0.11 level; all three other effects are highly significant.) These variables are two of very few indicators of the use of remote communications technologies that the NTS gathers, and the effects suggest that for otherwise identical workers, the one living in a household that orders all six types of enquired-about goods remotely and received deliveries at least three times per week (i.e. the highest possible score on this rough index of telecommunications usage) would work approximately 0.07 fewer days per week – which works out to a modest 1.5% drop in work-related journeys for a typical five-days-per-week worker. The analysis of number of days working at home implies an increase of 3.6% in the number of days working at home due to the highest possible score on the telecommunications usage index.

It should be noted that, though these findings of apparent linkages between telecommunications usage and work-related travel are robust after accounting for other effects, they should be viewed as suggestive-only pending more in-depth research. This would include both the use of more sophisticated statistical methods and drawing in additional types of data into the analysis.

5. Day-of-Week

Figure 10 and Figure 11 show the percentage of car driving journeys and mileage, respectively that is performed on each day of the week.

It can be seen that the number of car driving journeys made on Saturdays has trended down modestly over time, but that this is not the case for car driving mileage – meaning that average car driving journey length on Saturdays has been growing.

There is also a tendency for more car driving journeys and mileage to be made as the working week progresses from Monday to Friday, an effect which is more pronounced when the metric is mileage than when it is number of journeys.

Figure 12 and Figure 13 show the same information (number of journeys and mileage, respectively, by day of the week) for National Rail. As is the case generally with the rail usage observed in the NTS, the data is noisier than it is for car use.

Here we see much greater differentiation between weekday and weekend day than for car driving. Friday is not the weekday that sees the highest use as with car driving; rather it appears that Thursday is, with Monday being the lowest, both in terms of number of journeys and mileage.

There appears to have been an increase in the percentage of rail use that takes place on weekend days; this seems to be the case for journeys on Sundays, and for mileage (and less so, if at all, for journeys) on Saturdays.

Figure 10: Percentage of car driving journeys by day-of-week

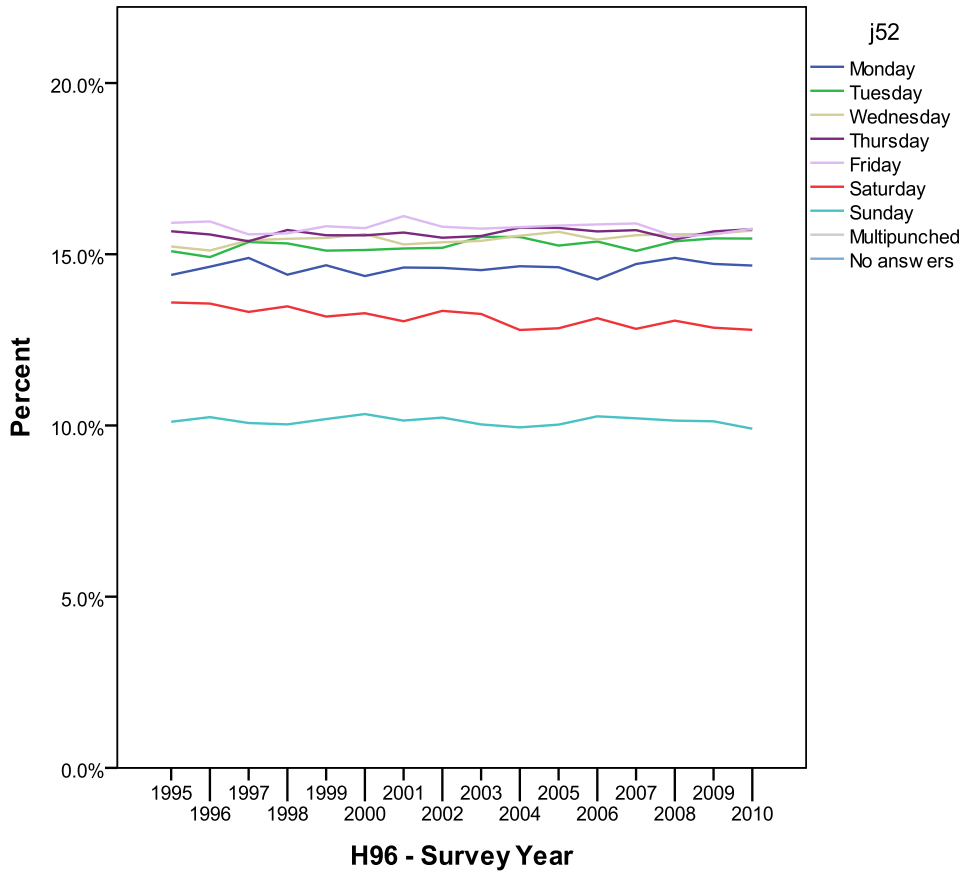


Figure 11: Percentage of car driving mileage by day-of-week

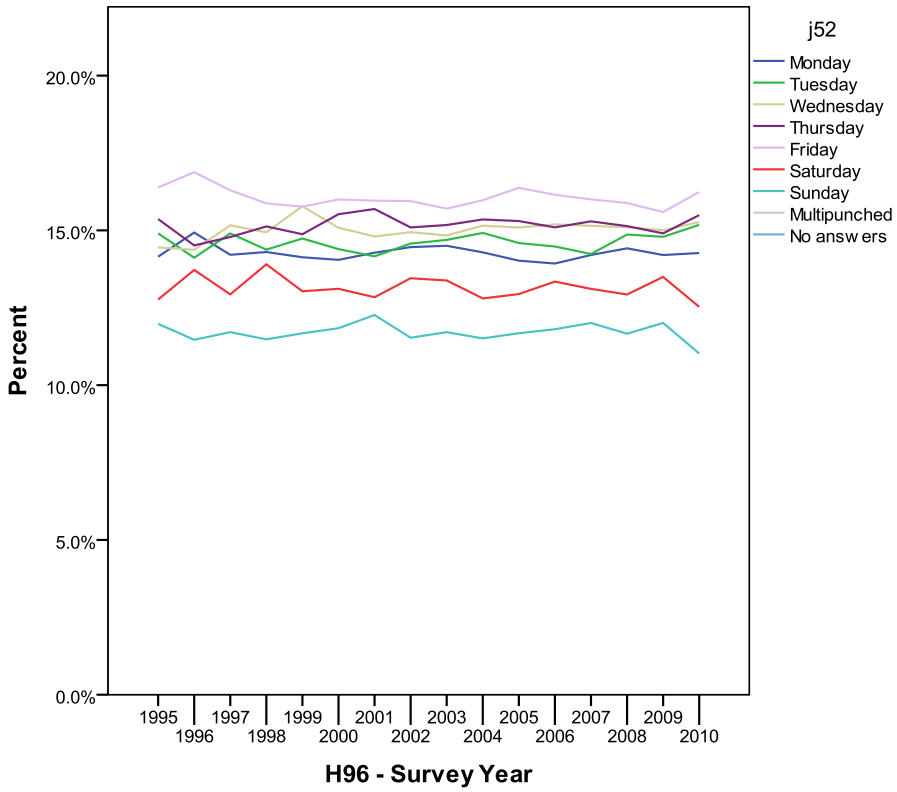


Figure 12: Percentage of National Rail journeys by day-of-week

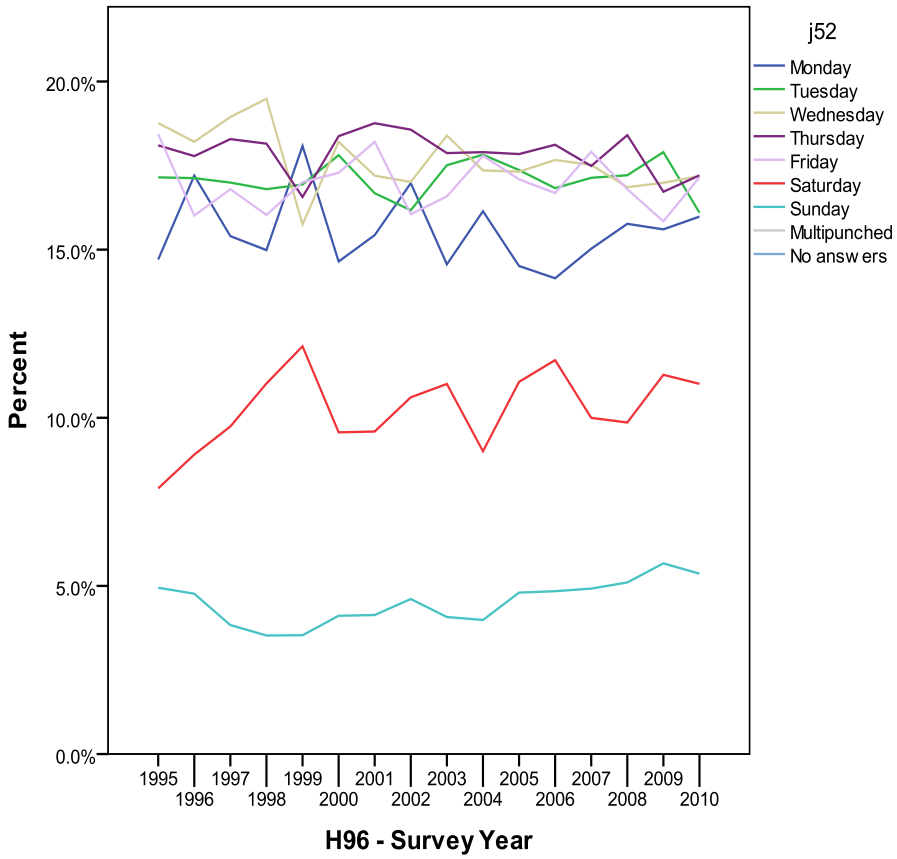


Figure 13: Percentage of National Rail mileage by day-of-week

6. Young People and Licences

This section looks at the falling level of driving-licence-holding by young people aged 17–29.

In recent years the NTS has been asking adults that do not have a full or provisional driving licence or are not learning to drive the reason(s) why they do not drive.

Figure 15 shows the percentage of the time that each reason is cited, as a proportion of the times it is cited as either the main or a secondary reason. The two reasons cited as the main reason more than half of the time that they were cited were: 'Physical/health difficulties' (89%) and any reason other than the classes in the listing (85%). At the other end of the scale, interestingly, were three of the reasons relating to the costs of driving: the cost of buying a car (cited as the main reason 17% of the time it was listed), unspecified 'other' motoring costs (14%), and the cost of insurance (11%). This is in sharp contrast to the costs of learning to drive: 62% of those people listing it cited it as the main reason they do not drive.

Figure 14 shows the different classes of reasons. The most frequently cited reason is the cost of learning to drive, which is cited by over 80%. The next three reasons, all of which were cited by over 20% of people, relate to not needing to drive, a lack of interest in driving, and the availability of other forms of transport. All other reasons were cited by less than 20% of people, with the smallest proportions saying that environmental reasons or congested roads kept them from having a driving licence, or admitting that they drive without a licence.

Figure 15 shows the percentage of the time that each reason is cited, as a proportion of the times it is cited as either the main or a secondary reason. The two reasons cited as the main reason more than half of the time that they were cited were: 'Physical/health difficulties' (89%) and any reason other than the classes in the listing (85%). At the other end of the scale, interestingly, were three of the reasons relating to the costs of driving: the cost of buying a car (cited as the main reason 17% of the time it was listed), unspecified 'other' motoring costs (14%), and the cost of insurance (11%). This is in sharp contrast to the costs of learning to drive: 62% of those people listing it cited it as the main reason they do not drive.

Figure 14: Reasons given by people aged 17–29 for not having a driving licence, 2009/10

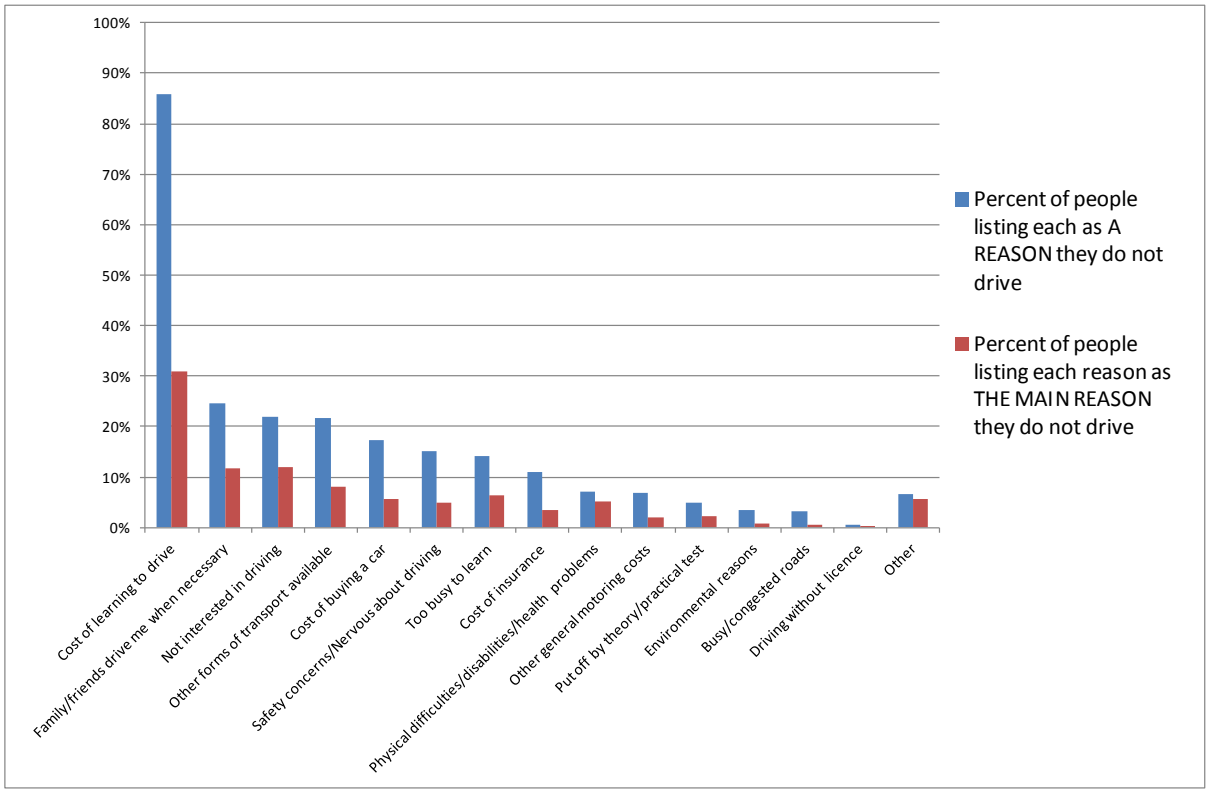


Figure 15: Of reasons given by people aged 17–29 for not having a driving licence, percentage saying that each reason is the main reason, 2009/10

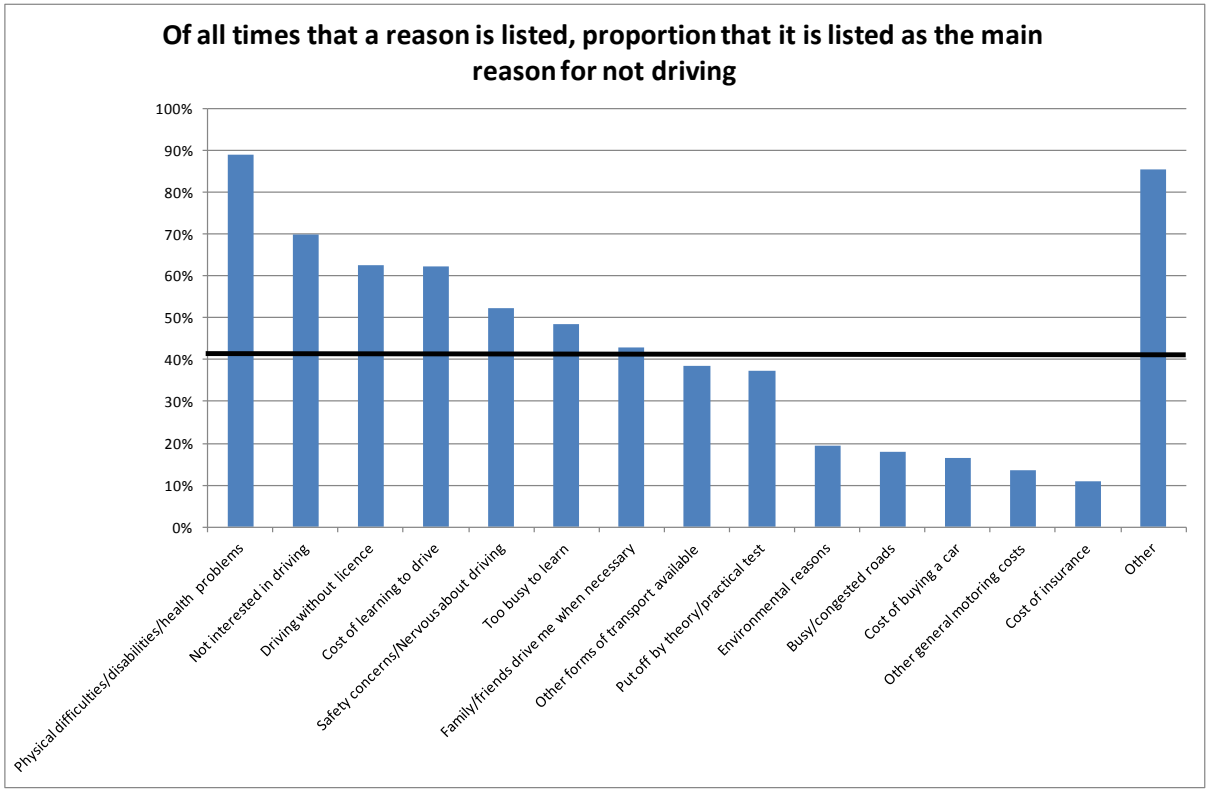


Figure 16 shows that nearly 50% (48%) of people listed only a single reason for not driving, and roughly three-quarters (74%) cited three or fewer reasons.

Figure 16: Frequency plot of number of reasons listed for not driving, people aged 17–29, 2009/10

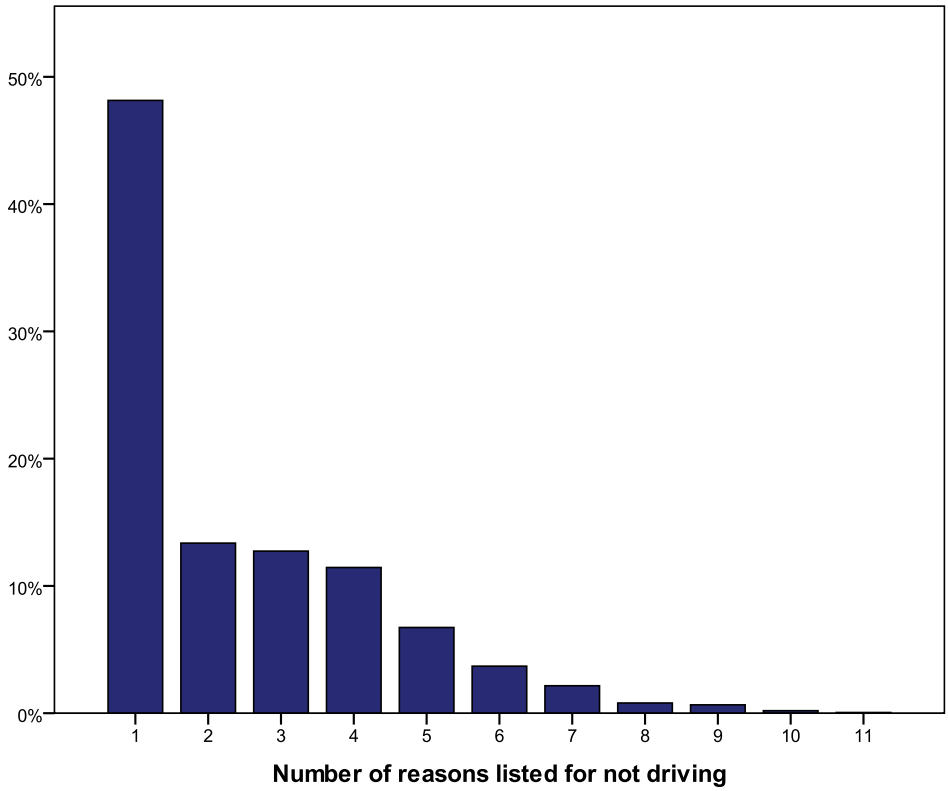


Table 2 compares the relative priority people placed on the various classes of reasons for not driving. The value in each cell is the proportion of time that the reason on the row is cited as the 'main reason', out of the total number of times that the reasons on both the row and column of the cell are cited *and* one of them is cited as the main reason. For example, when 'family/friends drive me' and 'other forms of transport are available' are both cited as reasons and one of them is cited as the main reason, 'family/friends drive me' is prioritised – cited as the main reason – 58% of the time and 'other forms of transport are available' is prioritised the other 42% of the time.

Amongst people citing 'safety concerns/nervousness about driving', this tended to be cited as the main reason (rather than merely a contributory reason) more than half of the time when compared against all other reasons with a sample of more than 25 people. This was also the case for people saying they were 'not interested in driving': this reason tended to be prioritised as the main reason listed.

When 'cost of learning to drive' was cited as a reason, it tended to be prioritised ahead of 9 of 11 other reasons. But interestingly, when the 'cost of insurance' was cited it tended to be listed as a contributory reason; this was the case when compared against all other reasons with a sample of more than 25 people.

Table 2: Matrix of prioritisation of reasons for not driving cited by people aged 17–29, 2009/10

When row & column reasons are both listed by a respondent, proportion where reason on row is prioritized over reason on column

	Family/friends drive me when necessary	Other forms of transport available	Cost of learning to drive	Cost of insurance	Cost of buying a car	Other general motoring costs	Environmental reasons	Safety concerns/ Nervous about driving	Physical difficulties/ disabilities/health problems	Too busy to learn	Put off by theory/practical test	Not interested in driving	Busy/congested roads	Driving without licence	Other
Family/friends drive me when necessary		58%	36%	74%	61%	66%	*	21%	*	31%	39%	28%	*	*	*
Other forms of transport available	42%		36%	78%	68%	77%	67%	26%	*	56%	36%	*	*	*	*
Cost of learning to drive	64%	64%		86%	83%	84%	70%	41%	*	61%	75%	44%	70%	*	*
Cost of insurance	26%	22%	14%		41%	36%	*	13%	*	24%	*	14%	*	*	*
Cost of buying a car	39%	32%	17%	59%		55%	*	24%	*	31%	*	13%	*	*	*
Other general motoring costs	34%	23%	16%	64%	45%		*	*	*	*	*	*	*	*	*
Environmental reasons	*	33%	30%	*	*	*		*	*	*	*	*	*	*	*
Safety concerns/Nervous about driving	79%	74%	59%	88%	76%	*	*		*	*	*	*	*	*	*
Physical difficulties/disabilities/health probler	*	*	*	*	*	*	*	*		*	*	*	*	*	*
Too busy to learn	69%	44%	39%	76%	69%	*	*	*	*		*	*	*	*	*
Put off by theory/practical test	61%	64%	25%	*	*	*	*	*	*	*		*	*	*	*
Not interested in driving	72%	*	56%	86%	87%	*	*	*	*	*	*		*	*	*
Busy/congested roads	*	*	30%	*	*	*	*	*	*	*	*	*		*	*
Driving without licence	*	*	*	*	*	*	*	*	*	*	*	*	*		*
Other	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

* = fewer than 25 responses

Table 3 contains the correlation matrix of the reasons cited for not driving. The matrix is colour-coded to highlight patterns: the colour ramp runs from green through yellow to red for large positive correlations through to large negative correlations.

It can be seen that people citing any one of the costs of driving also tended to site the other three classes of driving costs. By contrast, people citing health problems, being disinterested in driving, or 'other' tended to choose almost all other reasons relatively infrequently, particularly the cost of learning to drive. Interestingly, there were small positive correlations between citing environmental reasons and the costs of driving as the reasons that one is put off driving.

Table 3: Correlation matrix of reasons cited by people aged 17–29, 2009/10

	Correlations														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Family/friends drive me when necessary	A		0.28	-0.03	0.06	0.05	0.08	0.09	0.05	-0.08	0.08	0.07	-0.01	0.09	0.01	-0.11
Other forms of transport available	B	0.28		0.03	0.14	0.14	0.09	0.24	0.07	-0.08	0.14	0.09	0.06	0.16	0.00	-0.10
Cost of learning to drive	C	-0.03	0.03		0.55	0.52	0.32	0.08	0.04	-0.20	0.03	0.04	-0.23	0.08	-0.02	-0.21
Cost of insurance	D	0.06	0.14	0.55		0.76	0.49	0.16	0.07	-0.13	0.03	0.09	-0.09	0.14	-0.01	-0.13
Cost of buying a car	E	0.05	0.14	0.52	0.76		0.45	0.17	0.08	-0.14	0.03	0.06	-0.10	0.12	-0.02	-0.15
Other general motoring costs	F	0.08	0.09	0.32	0.49	0.45		0.12	0.03	-0.08	-0.01	0.07	-0.06	0.04	-0.02	-0.09
Environmental reasons	G	0.09	0.24	0.08	0.16	0.17	0.12		0.08	-0.03	0.12	0.03	0.10	0.22	-0.01	-0.02
Safety concerns/Nervous about driving	H	0.05	0.07	0.04	0.07	0.08	0.03	0.08		-0.01	0.00	0.09	0.01	0.26	-0.02	-0.07
Physical difficulties/disabilities/health problems	I	-0.08	-0.08	-0.20	-0.13	-0.14	-0.08	-0.03	-0.01		-0.09	0.00	-0.07	-0.03	-0.01	-0.07
Too busy to learn	J	0.08	0.14	0.03	0.03	0.03	-0.01	0.12	0.00	-0.09		0.03	-0.01	0.11	-0.02	-0.08
Put off by theory/practical test	K	0.07	0.09	0.04	0.09	0.06	0.07	0.03	0.09	0.00	0.03		-0.03	0.11	-0.01	-0.04
Not interested in driving	L	-0.01	0.06	-0.23	-0.09	-0.10	-0.06	0.10	0.01	-0.07	-0.01	-0.03		0.05	-0.03	-0.10
Busy/congested roads	M	0.09	0.16	0.08	0.14	0.12	0.04	0.22	0.26	-0.03	0.11	0.11	0.05		-0.01	-0.04
Driving without licence	N	0.01	0.00	-0.02	-0.01	-0.02	-0.02	-0.01	-0.02	-0.01	-0.02	-0.01	-0.03	-0.01		-0.01
Other	O	-0.11	-0.10	-0.21	-0.13	-0.15	-0.09	-0.02	-0.07	-0.07	-0.08	-0.04	-0.10	-0.04	-0.01	

A 'k-means' cluster analysis was then undertaken to extend the bivariate correlation analysis in Table 3 to simultaneously assess patterns amongst all reasons cited.

A four-cluster solution with intuitive properties was found, as shown in

Table 4. The values in each cell are the proportion of people in a given cluster citing each reason as either the main or a contributory reason for why they do not drive. The colour scheme is green to yellow to red corresponding to a large proportion of 'yes's through to a large proportion of 'no's.

A brief qualitative description of the clusters is:

- Cluster 1: **'Convenience'** – predominantly said that driving is unnecessary for them.
- Cluster 2: **'Cost alone' – p**redominantly said cost alone is the barrier to licence-holding.
- Cluster 3: **'Cost plus'** – cost frequently cited, as well as driving being unnecessary. A number of other non-cost reasons also cited more frequently than average.
- Cluster 4: **'None of the above' – n**o set of reasons is predominant. Cost of learning to drive (without any other costs) chosen most frequently of any reason.Table 5

Table 4: Proportion of cluster members citing each reason (clusters defined by reasons cited for not driving, people aged 20–29, 2009/10)

	Cluster			
	1	2	3	4
Family/friends drive me when necessary	0.76	0.00	0.82	0.00
Other forms of transport available	0.47	0.09	0.62	0.02
Cost of learning to drive	0.14	0.95	0.92	0.34
Cost of insurance	0.01	0.86	0.93	0.01
Cost of buying a car	0.06	0.93	0.90	0.04
Other general motoring costs	0.02	0.33	0.45	0.02
Environmental reasons	0.03	0.02	0.18	0.01
Safety concerns/Nervous about driving	0.06	0.10	0.19	0.08
Physical difficulties/disabilities/health problems	0.03	0.01	0.02	0.11
Too busy to learn	0.12	0.09	0.27	0.12
Put off by theory/practical test	0.06	0.06	0.12	0.04
Not interested in driving	0.13	0.04	0.24	0.23
Busy/congested roads	0.02	0.03	0.13	0.02
Driving without licence	0.01	0.00	0.01	0.00
Other	0.02	0.01	0.02	0.13

Table 5 shows profiles of the four clusters in terms of some basic demographics – it was found, for example, that members of the 'cost-alone' cluster has the lowest level of average income, both at the personal and household level. The 'Convenience' cluster had the highest proportion of its members living in Greater London, as well as the oldest average age. People in the 'Cost plus' cluster had the highest average incomes.

Table 5: Profile of clusters defined by reasons cited for not driving, people aged 20–29, 2009/10

	Cluster #1: 'Convenience'	Cluster #2: 'Cost alone'	Cluster #3: 'Cost plus'	Cluster #4: 'None of the above'	All people in sample
Percentage of sample (sample size in brackets)	22% (440)	21% (444)	13% (260)	44% (889)	100% (2,297)
Proportion female	55%	57%	58%	49%	52%
Average age	22.8	22.0	22.2	22.1	21.9
Average personal income (£/year)	£7,909	£5,960	£8,046	£7,060	£7,191
Average household income (£/year)	£37,567	£25,430	£38,625	£32,863	£35,556
Percentage living in London	29%	12%	15%	23%	21%
Percentage	32%	51%	67%	26%	29%

working full-time					

Respondents to the NTS are asked if they plan to learn to drive within the next year, the next year, the next five years, and so on. Using the responses of people saying that they expect to have a licence within the next year, a simple cohort analysis was performed to investigate whether there is a relationship between age and the actual rate at which people expecting to acquire a driving licence actually do so.

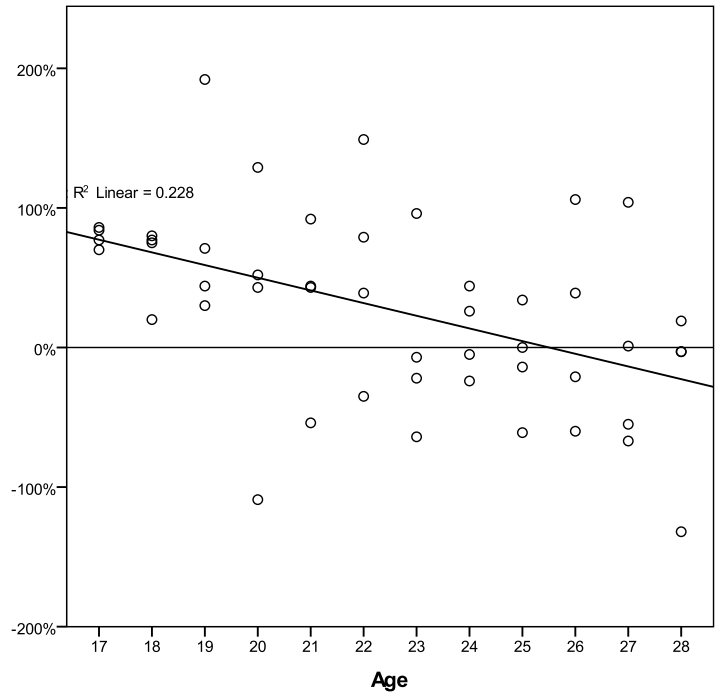
This analysis used data from 2006 to 2010. We observed, for example, the proportion of 17-year-olds in 2006 who do not have a licence but said they planned to acquire one in the next year. The actual percentage of 17-year-olds with a licence in 2006 was subtracted from the actual percentage of 18-year-olds in 2007, and this was then compared with the proportion of 17-year-olds in 2006 saying they planned to acquire a licence over the next year. This was done for ages 17 to 28 separately for each of the years 2006 to 2010.

Figure 17 shows the results of this analysis; each point in this plot represents the group of people of a single year of age over a single calendar year. For each year of age there are four points: one for the year of age in 2006 and a year older in 2007, one for that year of age in 2007 and a year older in 2008, and so on.

The main result from this analysis is that there seems to be a negative relationship between age and the actual rate of licence acquisition of people who had expected to have a license within a year's time. This implies that older people in this sample who said they expected to have a licence within a year seemed to be somewhat less likely to actually do so.

This analysis is based on a very simple specification – the application of more advanced time-series econometric techniques would be expected to (in all likelihood) confirm this finding and to yield additional insights into the dynamics of licence acquisition as young people age from their teens towards middle age.

Figure 17: Estimated actual licence acquisition rate of people aged 17 to 29 expecting to have a licence within the coming year, 2006 through 2010



The next analysis was a binary logistic regression of whether young people had a licence or not; results are shown in Table 6.

Table 6: Results from binary logistic regression of whether a person aged 17–29 has a full driving licence or not, 2009/10 (p-value in brackets)

	n=2,972 Null log-likelihood: -2,459.84 Final log-likelihood: -1958.37 Rho-squared: 0.20
Constant	-3.03 (<0.01)
Female	-0.141 (0.07)
Age	0.120 (<0.01)
Non-white ethnicity	-0.264 (0.03)
Born outside of UK	-0.623 (<0.01)
Personal income (£/year)	3.61E-5 (<0.01)
Residual household income (after subtracting personal income, £/year)	5.36E-6 (<0.01)
In employment	0.814 (<0.01)
Highest qualification is degree-level or higher	0.960 (<0.01)
Population density of postcode sector	-0.0105 (<0.01)
Lives in Inner London	-0.355 (0.11)
Lives in Outer London	-0.683 (<0.01)
Lives in a metropolitan area other than London	-0.175 (0.23)
Lives in a non-metropolitan area larger than 250K population	-0.0627 (0.66)
Lives in a settlement between 25K and 250K in population	-0.392 (<0.01)
Lives in a settlement between 3K and 25K in population	-0.266 (0.11)
Lives in a rural area	–

The *ceteris paribus* gender gap (the higher propensity for women to not have licences) is significant at the 0.07 level, just less significant than the standard 0.05 threshold.

The marginal effect of age is an increased tendency to hold a licence.

Being non-white is associated with a lower rate of licence-holding, all else being equal. The same goes for being born outside the UK. The effect of being born abroad is more than twice as large as the effect of being non-white.

Higher Income is associated with holding a licence, more so at the personal level than for income earned by other members of one's household, though both effects are highly significant.

Being employed and having a highest qualification that is at least at degree-level are both strongly associated with having a licence.

Higher-density neighbourhoods (as defined by the postcode sector of one's residence) are associated with lower rates of licence-holding, all else being equal.

The final variables included relate to the settlement size of the area where one lives. What is interesting is that there is not a fully monotonic relationship between settlement size and propensity to have a driving licence, once the other effects in this model are taken into account. Of all the settlement size categories (ranging from rural through to, separately, Inner and Outer London), we find that the lowest propensity to have a driving licence is linked with living in *Outer* London, whereas the highest propensity to have a licence is associated with residing in a rural area.

The last of the analyses of young people's licence-holding was a second binary logistic regression, where the dependent variable was defined to be one if a non-

licence-holding person cited one of the costs of motoring as the main reason they do not drive and zero otherwise. Thus the sample for this analysis only includes people who do not have a full or provisional driving licence or are not learning to drive.

Table 7: Results from binary logistic regression of whether a person aged 17–29 has a full driving licence or not, 2009/10

	n= 974 Null log-likelihood: -785.65 Final log-likelihood: -722.03 Rho-squared: 0.08
Constant	1.316 (<0.01)
Female	0.227 (0.07)
Age	-0.0516 (<0.01)
Non-white ethnicity	-0.0312 (0.88)
Born outside of UK	-0.814 (<0.01)
Personal income (£/year)	-2.78E-5 (0.01)
Residual household income (after subtracting personal income, £/year)	-1.02E-5 (<0.01)
In employment	-0.00436 (0.98)
Highest qualification is degree-level or higher	-0.00899 (0.71)
Population density of postcode sector	-0.00150 (0.56)
Lives in Inner London	-0.358 (0.31)
Lives in Outer London	-0.298 (0.27)
Lives in a metropolitan area other than London	0.0859 (0.74)
Lives in a non-metropolitan area larger than 250K population	0.0853 (0.73)
Lives in a settlement between 25K and 250K in population	0.0871 (0.72)
Lives in a settlement between 3K and 25K in population	0.190 (0.53)
Lives in a rural area	–

We see that the goodness-of-fit for this model is much lower (0.08) than for the previous model of whether a person has a licence or not (0.20) – thus this simple specification proves less able to explain patterns of whether young people consider the costs of motoring to be deterring them from driving.

Once again we happen to find an all-else-equal gender gap (in this case implying that a woman is less likely to cite cost as the main reason than an otherwise identical man), but significant at the p-0.07 level.

Being older is associated with being less likely to cite cost as the main reason for not driving.

No significant or close-to-significant effect due to ethnicity was found (the variable we tested is binary for white/non-white). Being born outside the UK was, however, found to be strongly associated with *not* citing cost as the main reason for being put off driving.

Income both at the personal and earned-by-others-in-household levels was found to be associated with a lower propensity to cite cost as a deterrent, a rather intuitive finding.

The remaining variables (whether one is employed, population density of one's neighbourhood, and settlement size) were all found not to have statistically significant effects.

7. Rail Fares

This section investigates whether there is evidence of 'yield management' – the notion of selling a larger number of cheap rail tickets in order to fill seats that would otherwise go empty.

The analysis looks at the distribution of rail tickets on the basis of their price, which is in 2010 price levels normalised by journey distance. The unit of analysis is the 'journey stage', which basically means that any journey which involves transferring between trains is counted in the data as separate journey stages for each train that was boarded.

Due to the small sample sizes for rail in the NTS, this analysis is based on two year groups: 1995 to 1999, and 2006 to 2010. Journey purposes are combined into three categories: commuting, business, and all travel for any other purposes.

The six figures that follow (Figure 18 to Figure 22) show cumulative distribution plots for the three classes of journey purposes, first the full distributions (with the exception of truncated upper tails) and then with the bottom of the distribution magnified.

The distributions only include journeys where some fare was paid – they exclude journeys made on season tickets, but do include pay-per-journey means of payment such as pre-purchased carnets.

It can be seen that for commuting and business journey purposes the proportion of tickets sold at low cost-per-mile actually decreased – thus we do not find evidence for 'yield management' pricing have affected these rail markets.

We do find evidence of yield management in the all-but-commuting-and-business market, however – here the data shows an increased proportion of rail tickets sold at low-cost-per-mile. 10% of rail tickets were sold for less than nine pence-per-mile in 1995/9; this rose to 14% of tickets being sold for less than nine pence-per-mile by 2006/10.

These results are broadly reasonable – one would expect the largest amount of available seating (i.e. conducive to yield management) on trains operating outside of the peak hours, which is precisely when non-commuting/business journeys tend to be made. They should be viewed in light of the distinction between those rail fares that are regulated and those where the operator has greater discretion in setting price levels.

Figure 18: Cumulative distribution of National Rail fares for commuting purposes

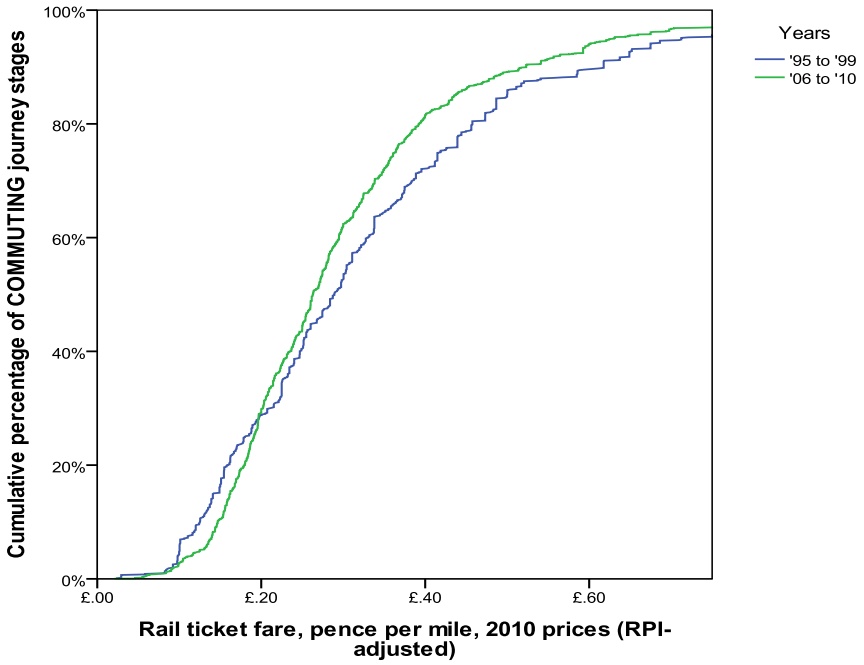


Figure 19: Cumulative distribution of National Rail fares for commuting purposes, bottom of distribution magnified

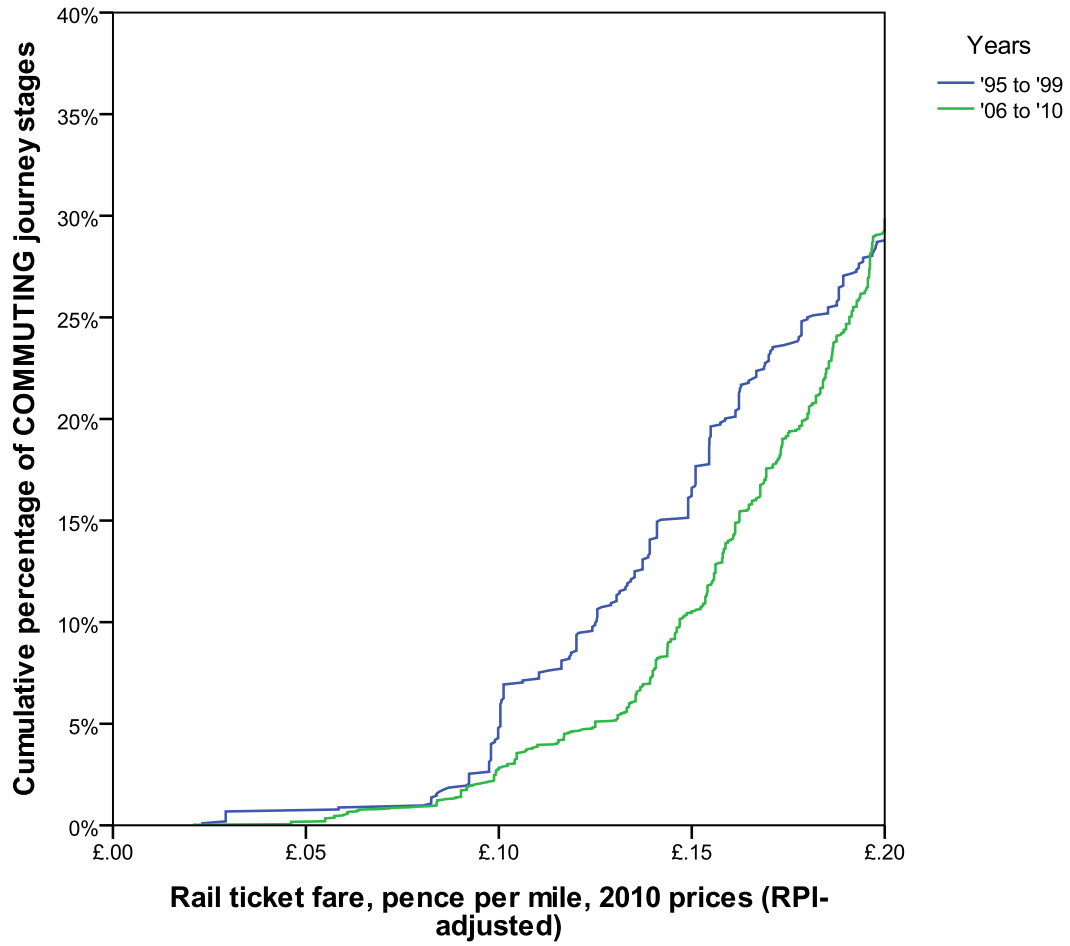


Figure 20: Cumulative distribution of National Rail fares for business purposes

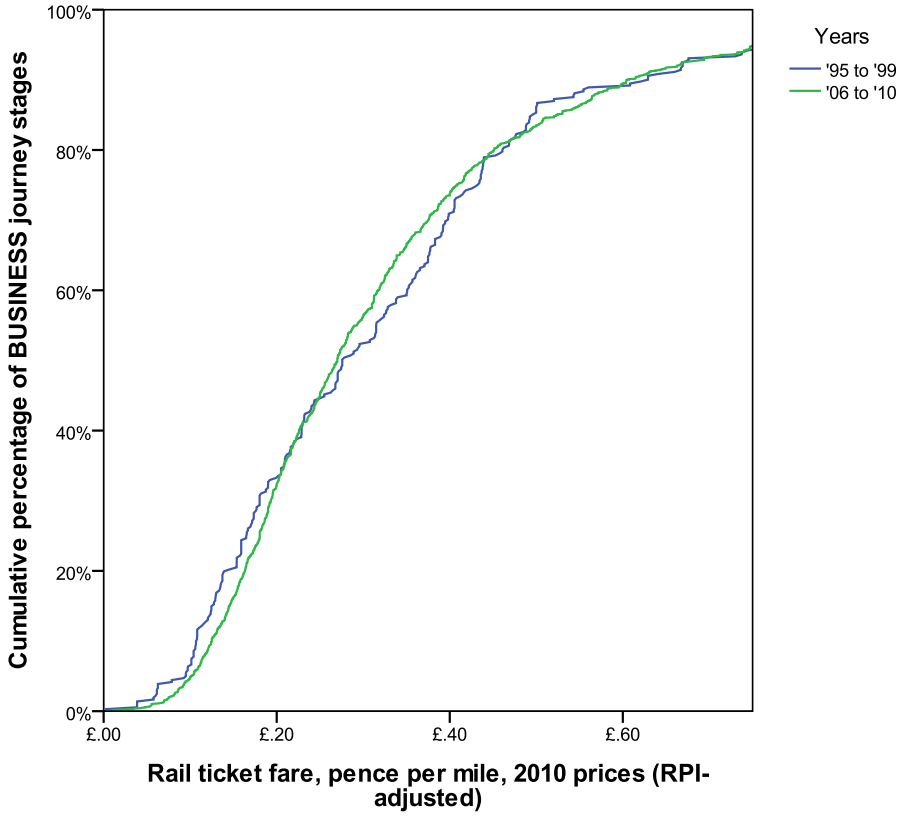


Figure 21: Cumulative distribution of National Rail fares for business purposes, bottom of distribution magnified

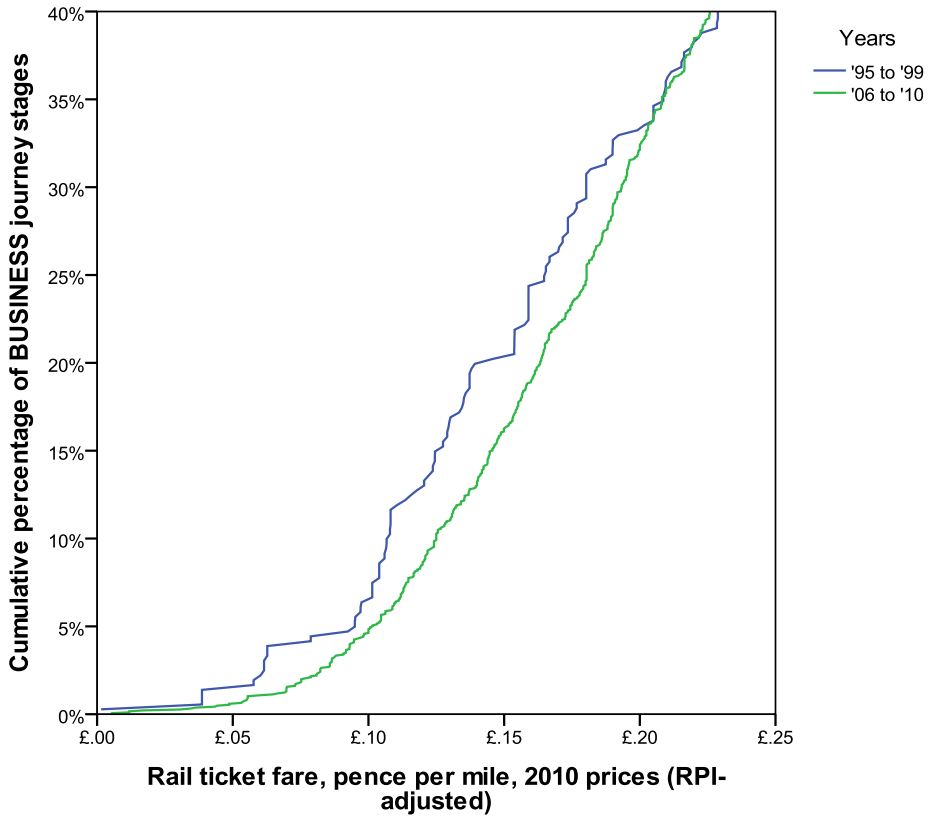


Figure 22: Cumulative distribution of National Rail fares for all but commuting and business purposes

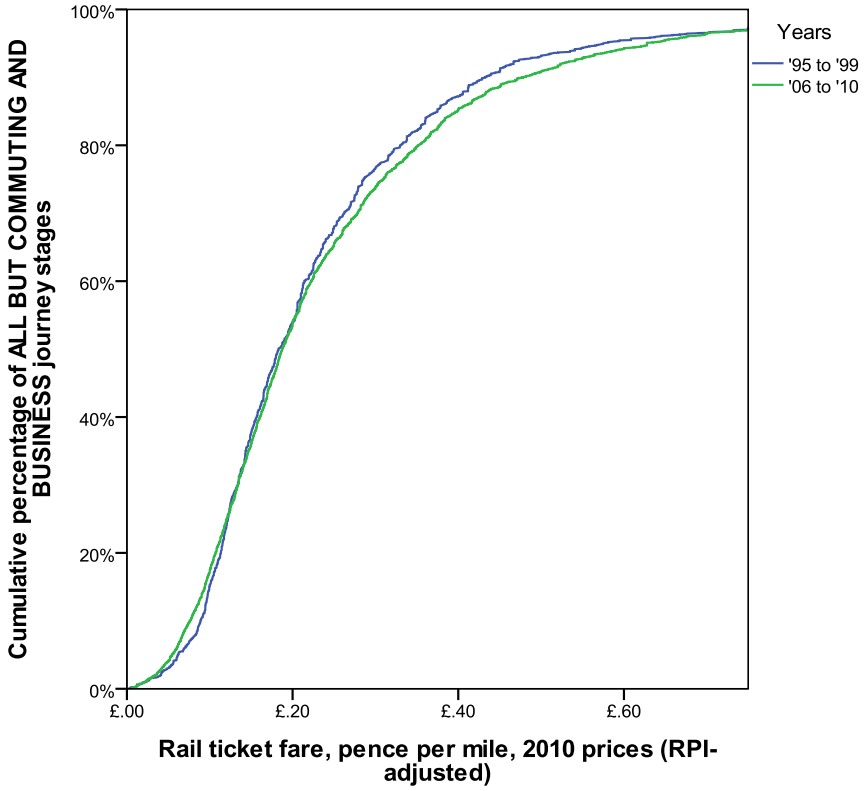
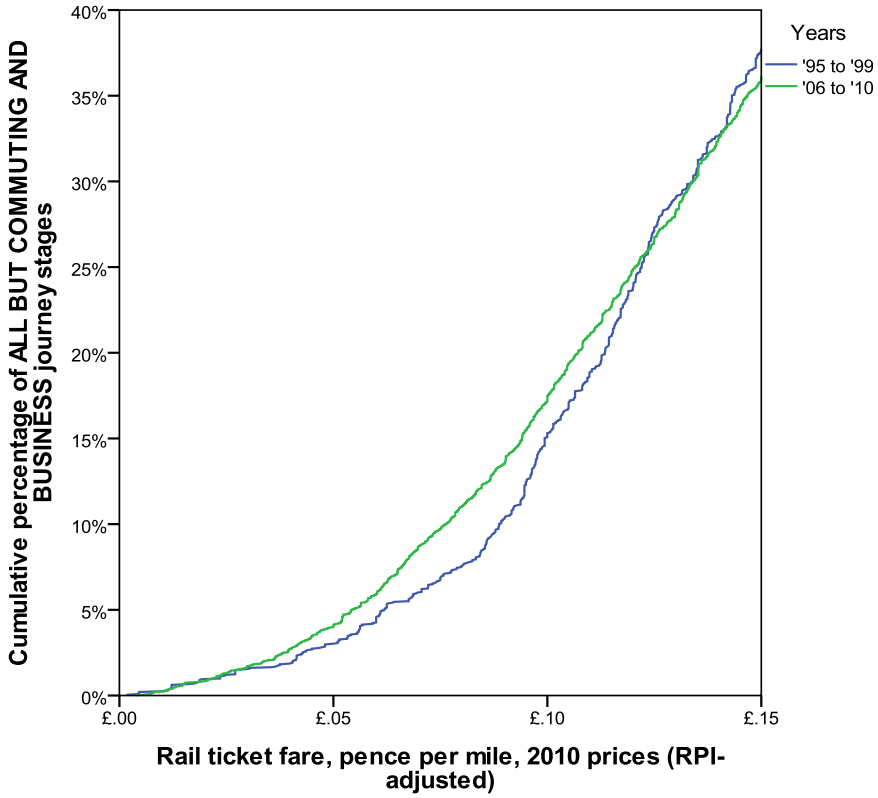


Figure 23: Cumulative distribution of National Rail fares for all but commuting and business purposes, bottom of distribution magnified



8. Journey Purposes

This section looks at changes in the number of journeys made during NTS respondents' diary weeks for various purposes.

The data is weighted at the NTS-respondent level, but not with the NTS' journey-level weights; this is so that the number of journeys per week is an integer for each person, thus allowing the visual presentation of results shown here.

Results are shown for adults and children separately; further detailed breakdowns by age and gender are available on request from the authors.

Detailed definitions of journey purposes can be found in the NTS documentation.

The rest of this section briefly describes what the results show – it should be stressed that this is an exploratory analysis; the findings require more in-depth research to properly understand the changing trends and what may be causing them.

As discussed in Section 4, there has been a falling number of commuting journeys per person over time, which is also evident from Figure 24. The biggest drop seems to be in the proportion of people making six or more journeys to work activities.

The NTS did not distinguish between food shopping and non-food shopping before 1998, which can be seen in both Figure 27 and Figure 28. Figure 27 shows an especially marked fall over time in the proportion of people making six or more trips to food stores. There is a step change in the number of food shopping trips per child; this appears to be due to simply recharacteristing some trips to food stores by children after the change of NTS contractor in 2002 from trips for 'food shopping' purposes to trips for 'escort to shopping/personal business' purposes (see Figure 44). By contrast, the fall in non-food-shopping trips by children appears to be genuine as it is essentially a year-on-year fall from 2000 onwards. This last result is certainly ripe for further enquiry to better understand why this has happened and whether it is likely to continue.

Figure 29 shows an increasing number of trips to medical-related activities over time, which further analysis showed to be especially concentrated amongst people aged 70+.

Figure 30 shows that the number of people who record making trips to eat/drink alone is very small, and much smaller than the number who record journeys to eat/drink together with friends/relatives (see Figure 32). Figure 32 also shows that journeys to eat/drink with friends/relatives increased in the mid- to late-1990s, and has since been more stable.

Figure 31 shows that trips to unspecified 'personal business' activities have been generally stable over time.

In Figure 33 it can be seen that the number of trips by adults to visit friends/relatives at private homes has been trending downwards over time, an effect which seems predominantly due to a falling number of people who make many trips (four or more per week) to visit friends/relatives at home. This trend has also been concentrated amongst younger adults (as shown in Figure 34), and particularly for younger men the fall has been disproportionately at weekends (also shown in Figure 34).

Figure 35 shows that there has been a countervailing increase (at least until the 2007+ recession) in the number of trips made for other social purposes, but that this increase is a much smaller magnitude than the fall in visiting friends/relatives at homes. Figure 36 shows a similar result for entertainment/public activities, which is clearer for children than adults, but again not very large. Thus there does not seem to be one-for-one substitution of not-in-homes socialising to compensate for the fall in in-homes socialising.

In Figure 37 it can be seen that, unsurprisingly, children generally make more trips to participate in sport than adults do.

Figure 38Figure 37 shows an upward trend in the number of trips to holiday-destination-bases (i.e. residences such as hotel rooms or cottages where one stays whilst on holiday).

Figure 39 shows that in recent years NTS respondents are reporting more journeys in the 'day trip/just walk' category, particularly children.

Figure 40 shows that NTS respondents report very few journeys for non-escort purposes that are classified as 'other' than the previously-listed purposes.

The remaining figures (Figure 41 to Figure 45) relate to escort travel – in all cases these are minority activities, with well fewer than 50% of people (either children or adults) performing any one of these classes of escorting journeys. Several apparent artefacts due to the change of NTS contractor in 2002 can be seen – e.g. the jump in 'escort other' travel from 2002 onwards.

Figure 24: Percentage of children and adults by number of journeys to work activities during NTS diary week

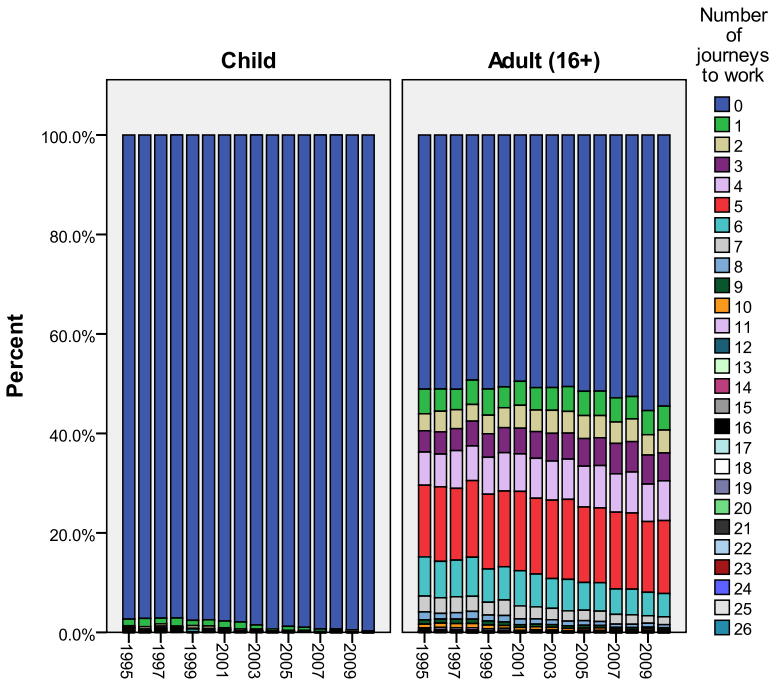


Figure 25: Percentage of children and adults by number of journeys in the course of work activities during NTS diary week

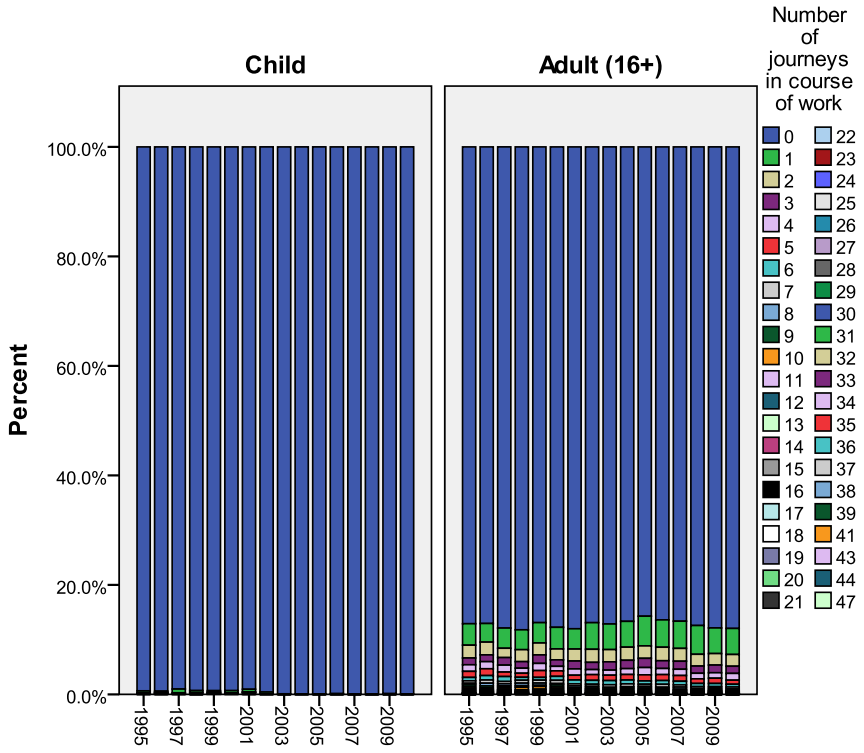


Figure 26: Percentage of children and adults by number of journeys to education activities during NTS diary week

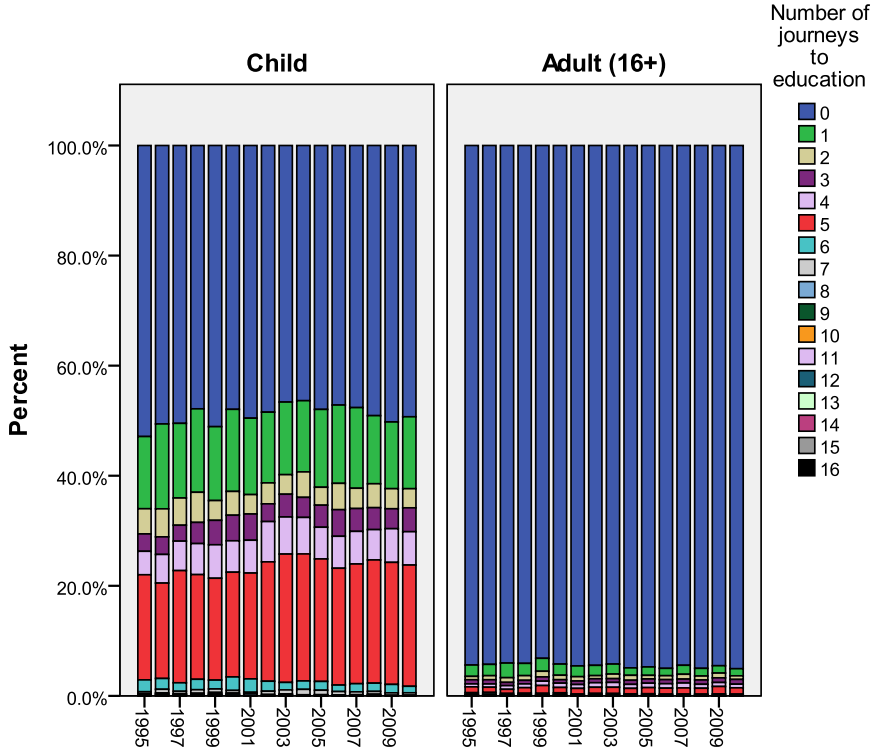


Figure 27: Percentage of children and adults by number of journeys to food shopping activities during NTS diary week

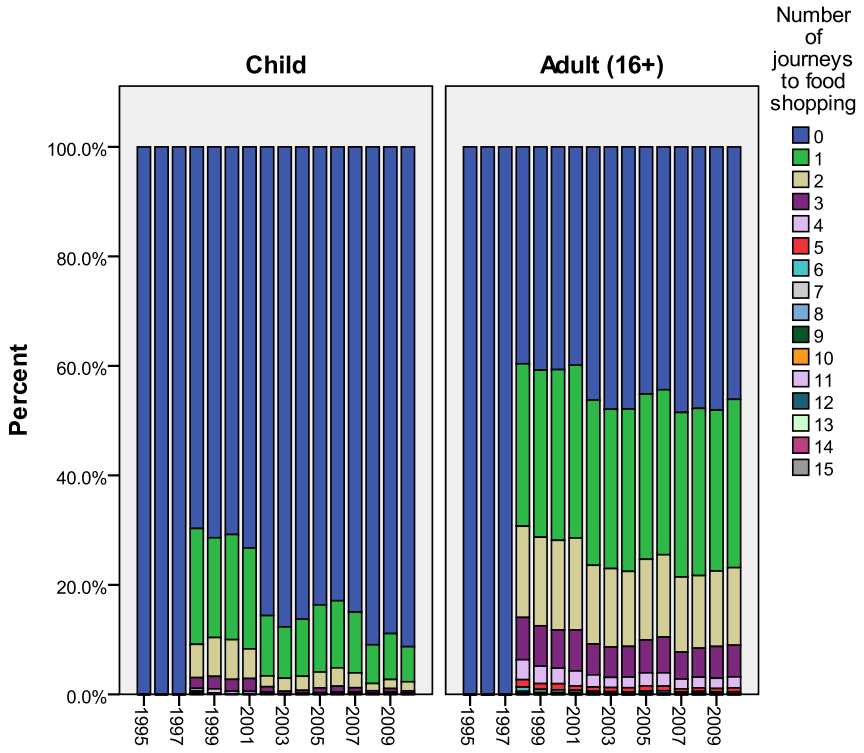


Figure 28: Percentage of children and adults by number of journeys to non-food shopping activities during NTS diary week

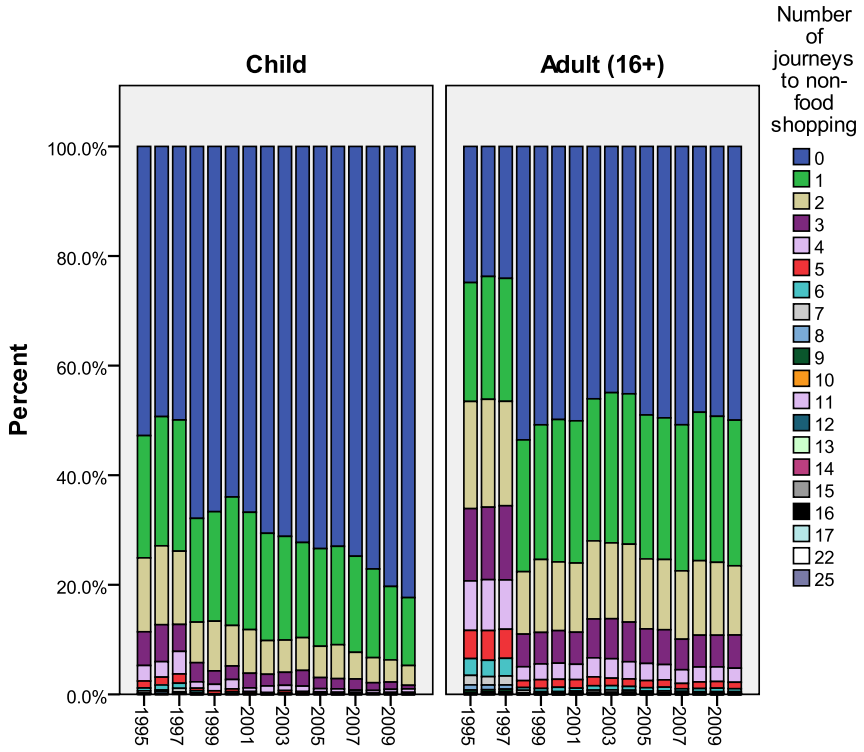


Figure 29: Percentage of children and adults by number of journeys to medical activities during NTS diary week

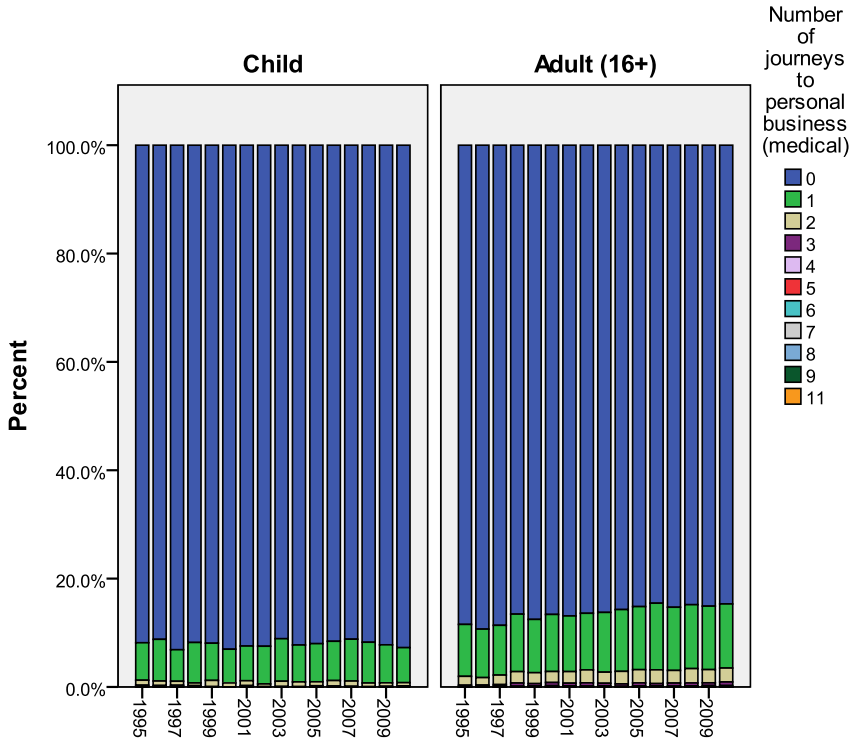


Figure 30: Percentage of children and adults by number of journeys to eat/drink alone activities during NTS diary week

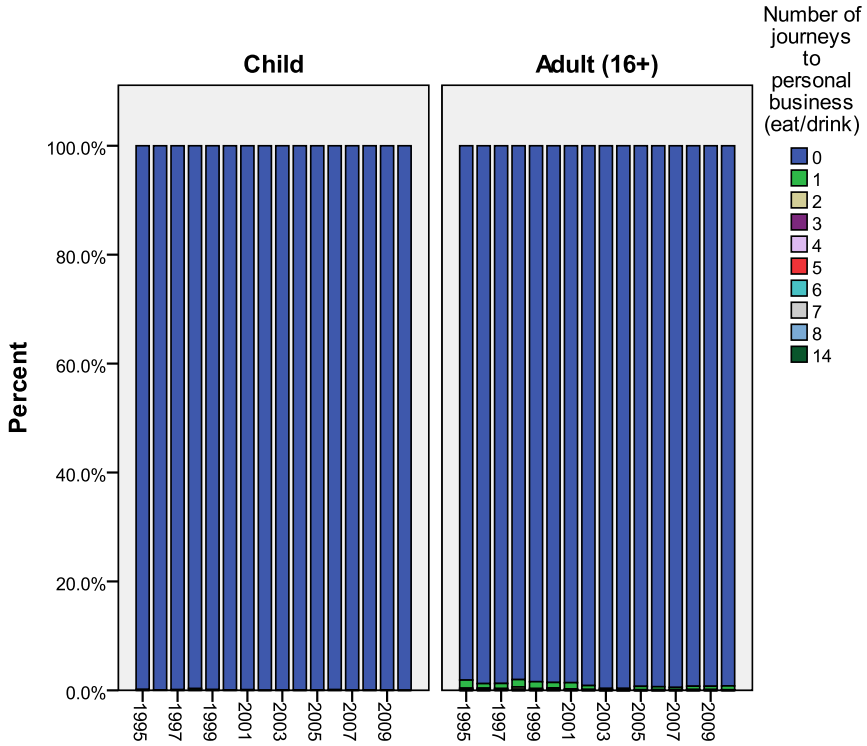


Figure 31: Percentage of children and adults by number of journeys to other personal business activities during NTS diary week

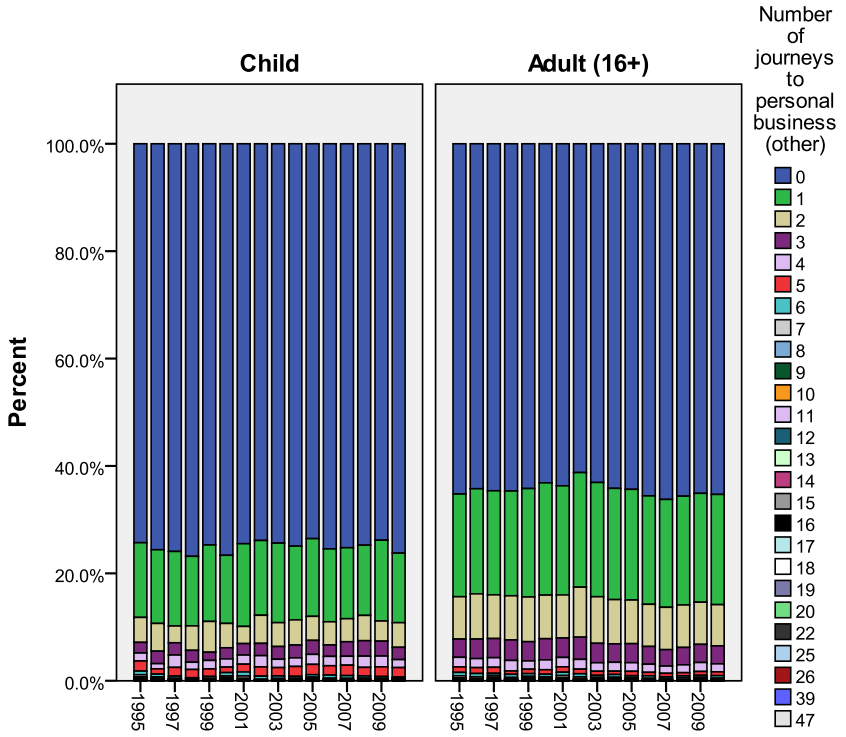


Figure 32: Percentage of children and adults by number of journeys to eat/drink with friends/relatives activities during NTS diary week

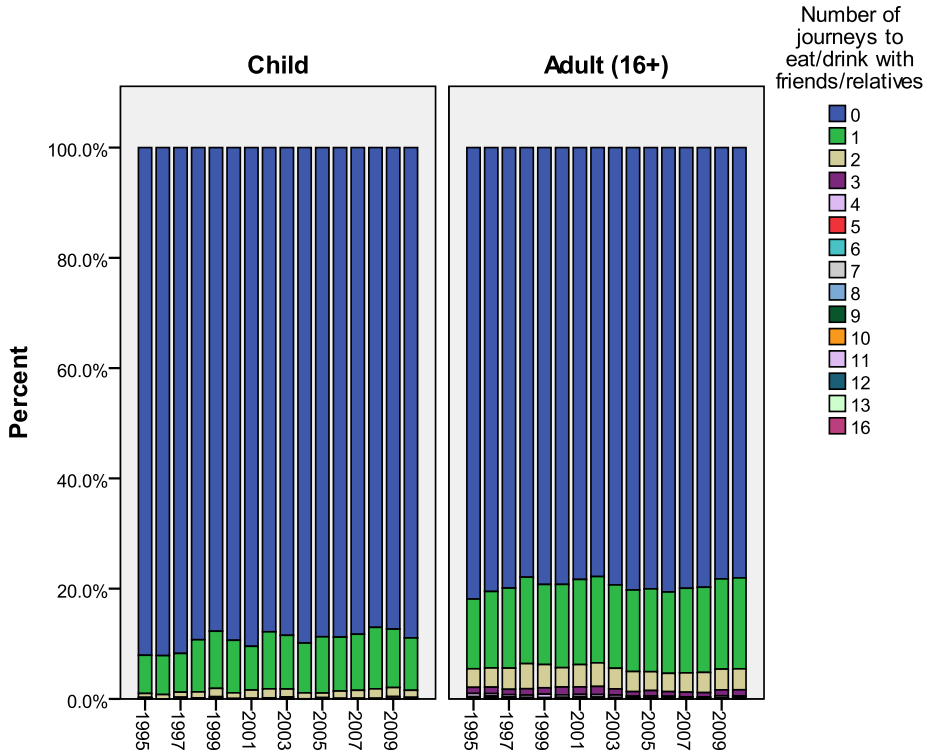


Figure 33: Percentage of children and adults by number of journeys to visit friends/relatives at private home activities during NTS diary week

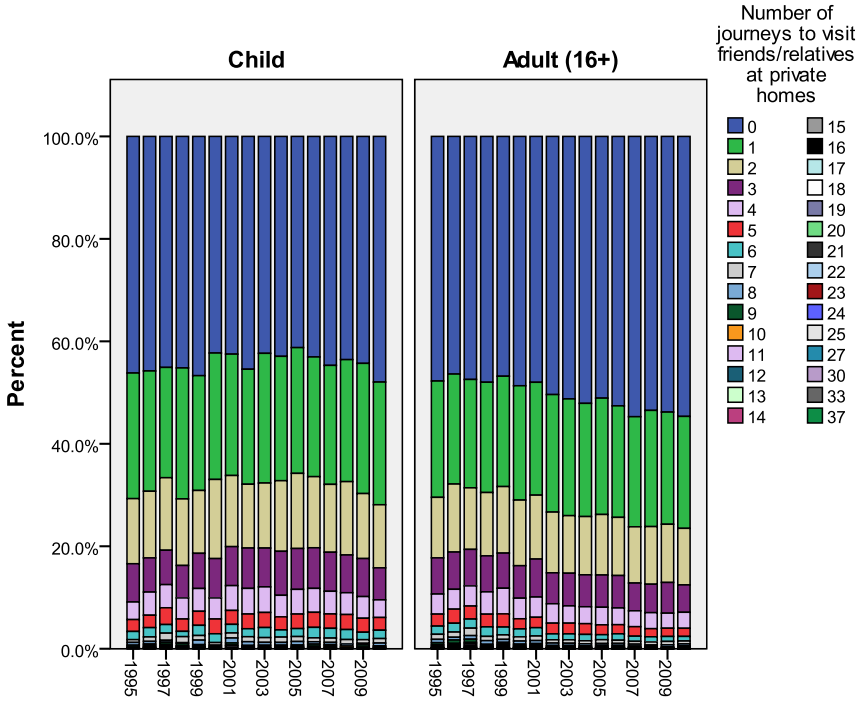


Figure 34: Number of journeys to visit friends/relatives at private homes, by day-of-week, gender and age

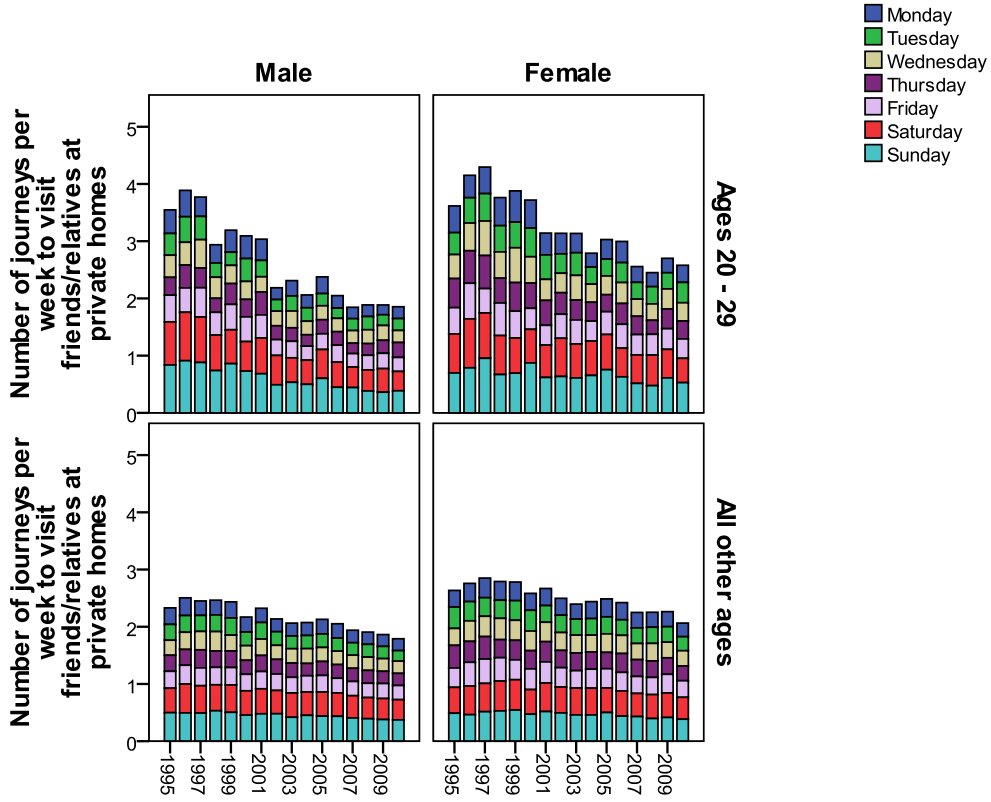


Figure 35: Percentage of children and adults by number of journeys to other social activities during NTS diary week

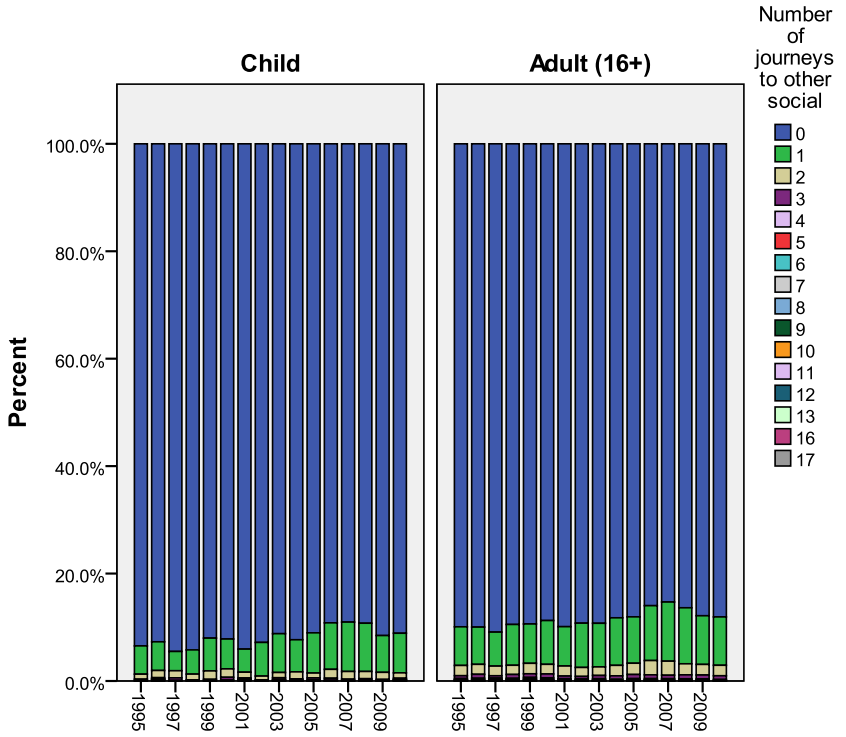


Figure 36: Percentage of children and adults by number of journeys to entertainment/public activities during NTS diary week

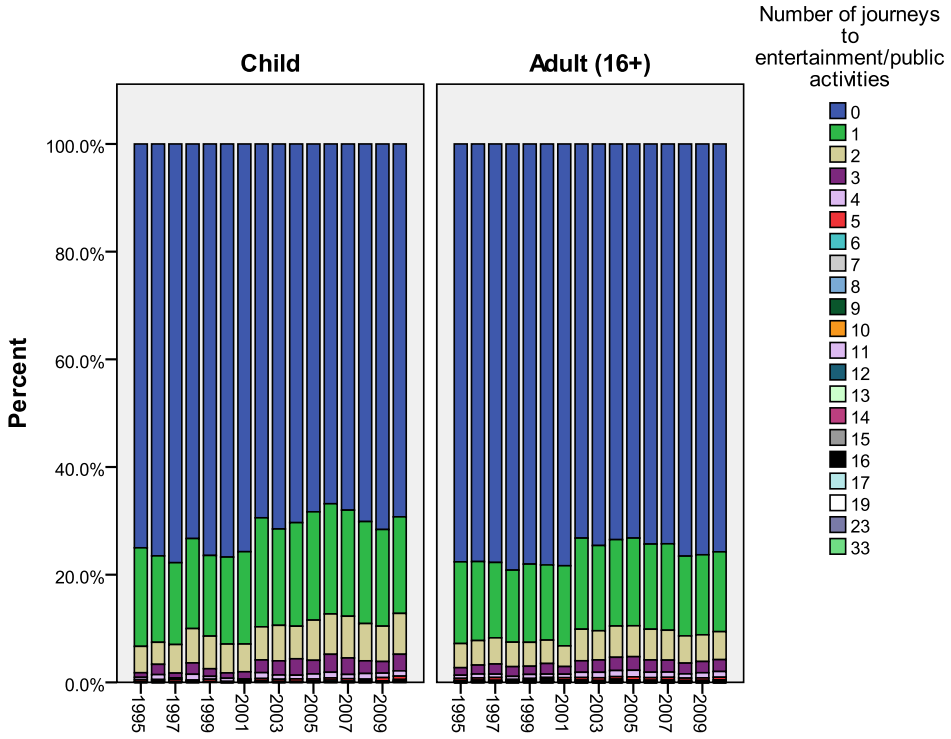


Figure 37: Percentage of children and adults by number of journeys to participate-in-sport activities during NTS diary week

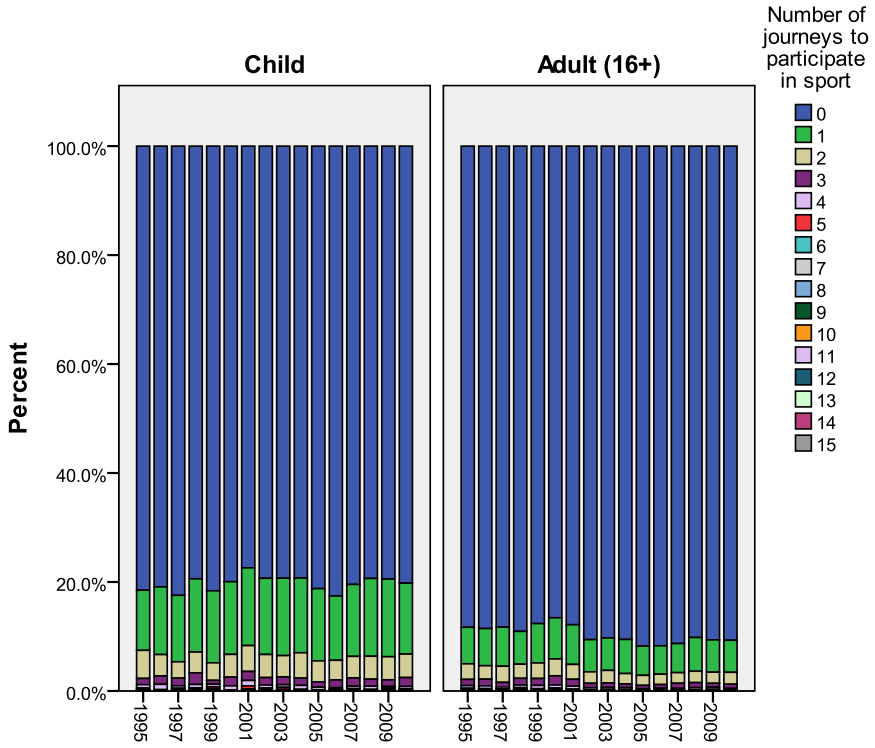


Figure 38: Percentage of children and adults by number of journeys to holiday-destination-base activities during NTS diary week

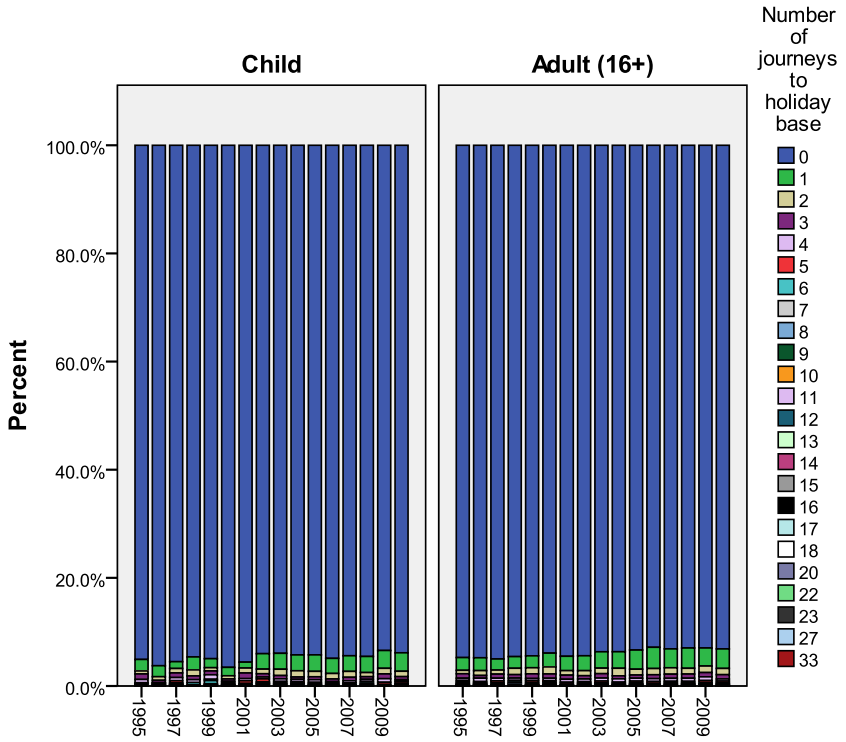


Figure 39: Percentage of children and adults by number of journeys to day trip/just walk activities during NTS diary week

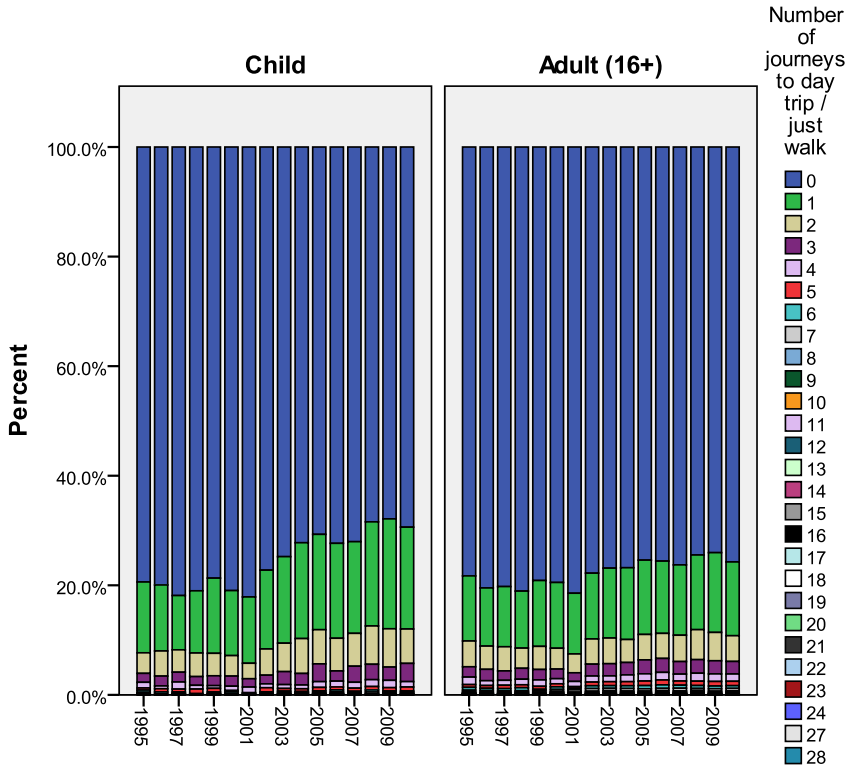


Figure 40: Percentage of children and adults by number of journeys to other non-escort activities during NTS diary week

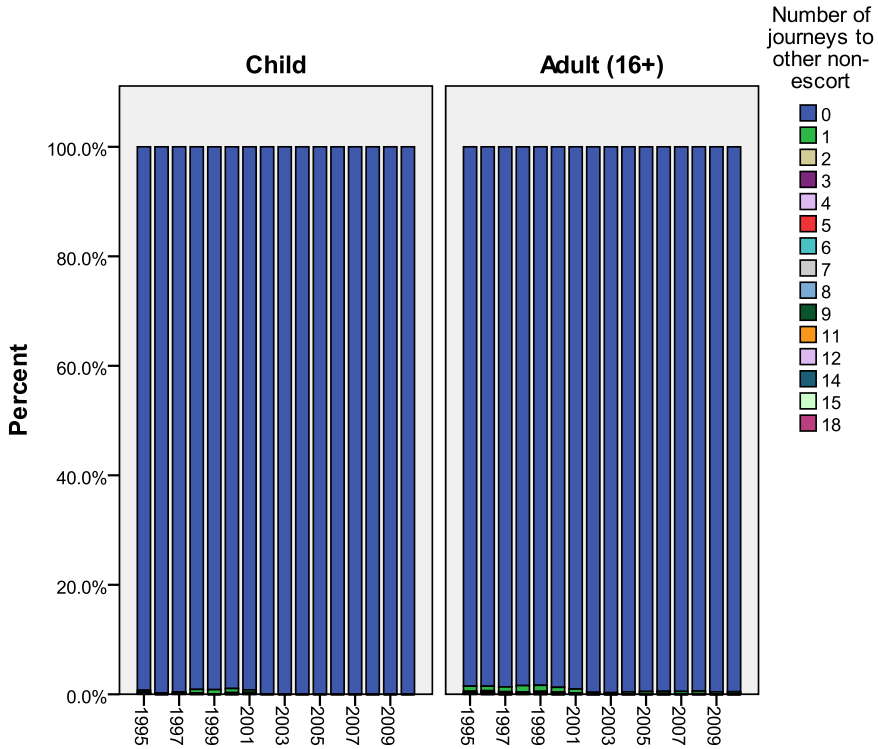


Figure 41: Percentage of children and adults by number of journeys to escort-to-work activities during NTS diary week

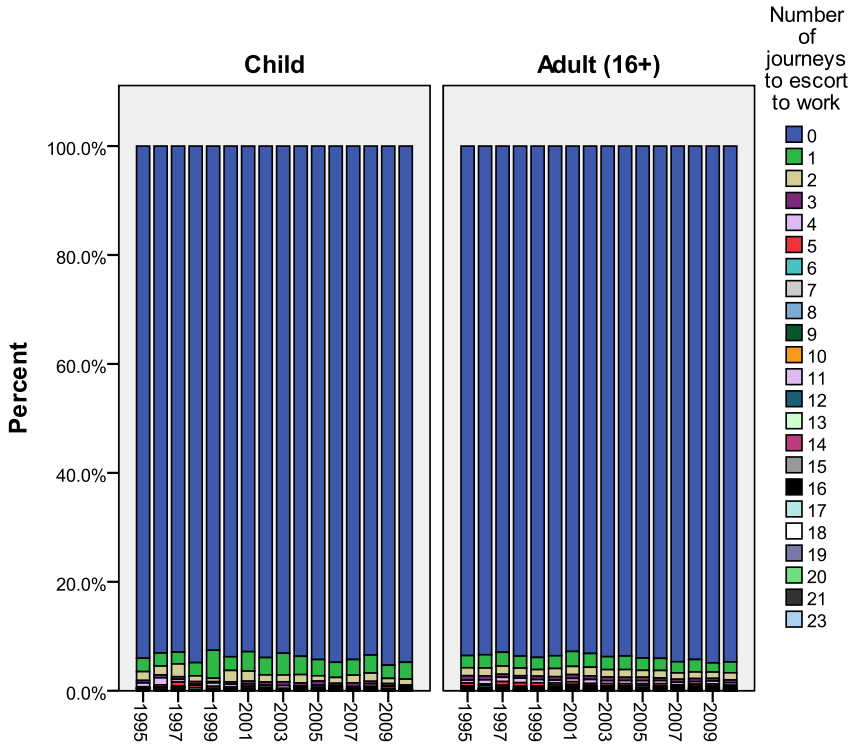


Figure 42: Percentage of children and adults by number of journeys to escort in course of work activities during NTS diary week

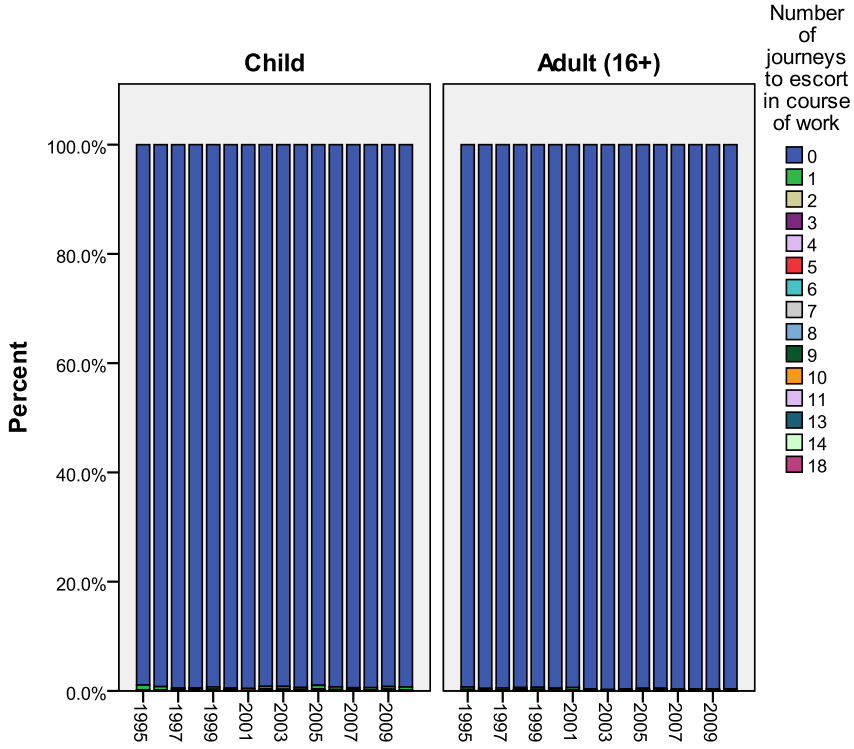


Figure 43: Percentage of children and adults by number of journeys to escort-to-education activities during NTS diary week

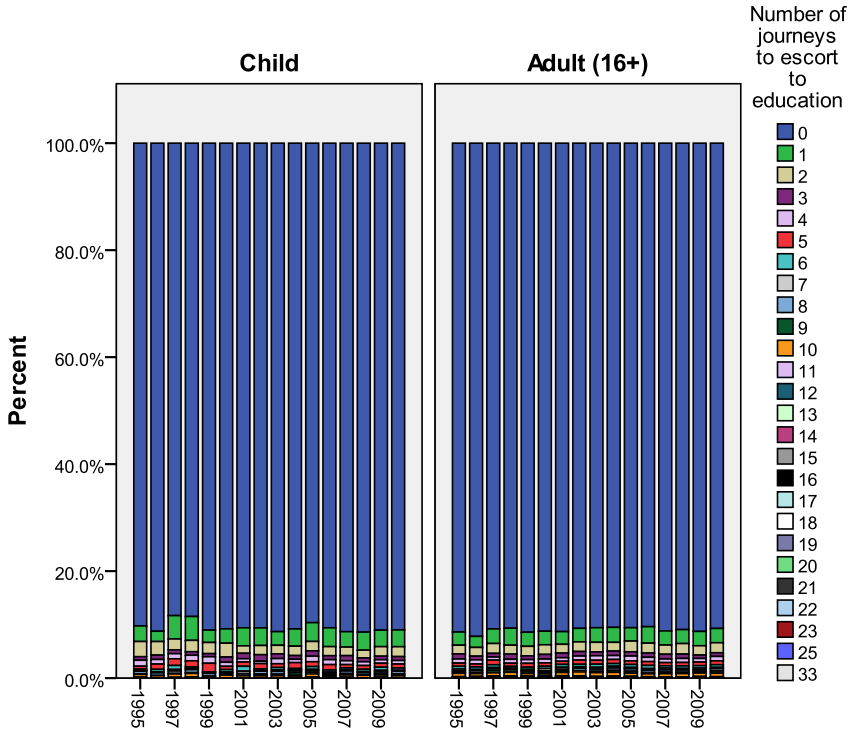


Figure 44: Percentage of children and adults by number of journeys to escort to shopping/personal business activities during NTS diary week

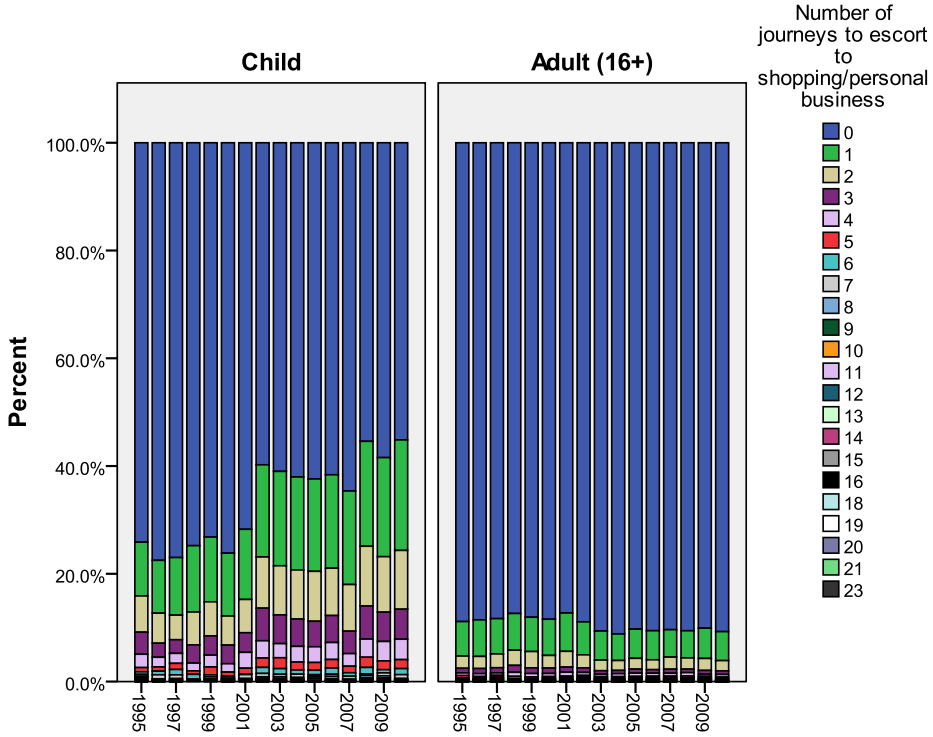
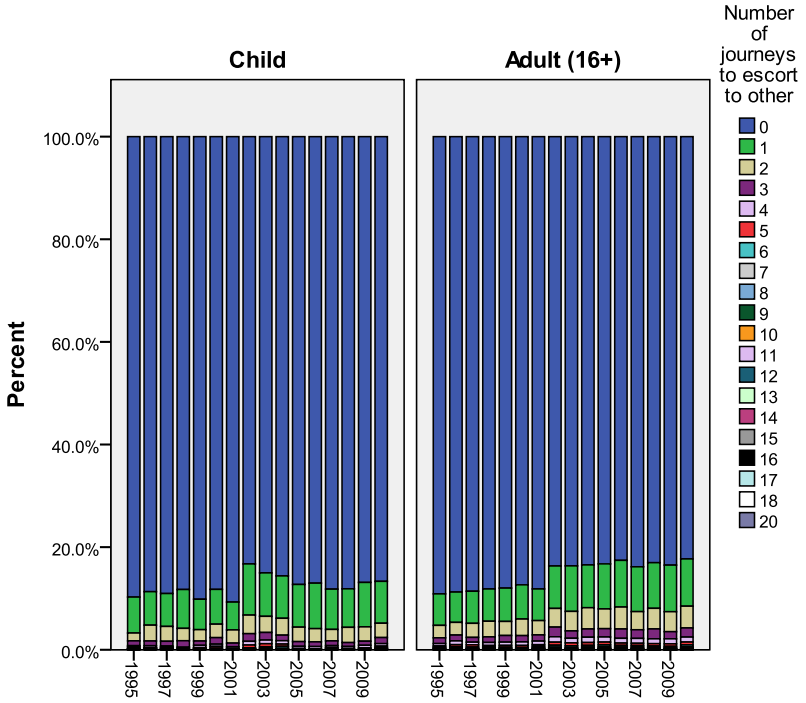


Figure 45: Percentage of children and adults by number of journeys to escort-to-other activities during NTS diary week



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