



Young People's Travel - What's Changed and Why? Review and Analysis

Final Report

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Glossary

Term	Definition
<i>Research terminology</i>	
Baby Boomers	Demographic group born during the post-World War II baby boom, approximately between the years 1946 and 1964
Birth cohort	People born during the same time period (however defined)
Car access	Having car access is defined for the purposes of this study as being the driver of a household car or van, either as the main driver or an additional driver
Echo Boomers	Children of the Baby Boomer generation born from the mid-1970s to mid-1990s
Generation X	Demographic group born in the late 1960s to late 1970s
Generation Y / Millennials	Demographic group born in the last two decades (1980s, 1990s) of the twentieth century.
Generation Z / Post-Millennials	Demographic group born in the first two decades (2000s, 2010s) of the twentieth century.
Age effects	Variations associated with age that remain more or less stable over time
Cohort effects	Changes across groups of individuals who experience an initial event together, such as their birth year
Period effects	Variations over time that affect everyone alive at a given time, irrespective of their age
Young people	People aged between 17 and 29.
<i>Acronyms and abbreviations</i>	
BHPS	British Household Panel Survey
HE	Higher education is degree education offered in universities and also some further education colleges
ICTs	Information and Communication Technologies
LCFS	Living Costs and Food Survey
LSOA	Lower Layer Super Output Area is a geographical unit of analysis for the collection and publication of small area statistics. They have an average of roughly 1,500 residents and 650 households.
NEET	Not in Education, Employment, or Training
NHTS	National Household Travel Survey of the U.S. Department of Transportation which conducted surveys in 2001 and 2009

NTS	National Travel Survey of Great Britain (of England only since 2013)
ONS	Office for National Statistics - the UK's largest independent producer of official statistics and its recognised national statistical institute
UKHLS	UK Household Longitudinal Study (also known as Understanding Society)

Executive Summary

The study

Young adults in Great Britain and other countries are driving less now than young adults did in the early 1990s. The Department for Transport (DfT) commissioned the Centre for Transport and Society (UWE, Bristol) and the Transport Studies Unit (University of Oxford) to carry out a systematic assessment of available evidence on the subject, both by review of UK and overseas published literature, and by new secondary analysis of existing UK data sets. The study sought to address the questions:

- In what ways have changes in young people's social and economic conditions, and lifestyles and attitudes impacted on their travel behaviour?
- How might those drivers, or other anticipated changes, be expected to impact their future travel demand?

The evidence has been evaluated on the basis of an extensive review of both transport-specific and wider social science literature in the UK (and other countries where, despite national differences, the trends show many similar patterns), and new analysis of data from the National Travel Survey (NTS) (1995-2014), the Census (2001 and 2011) and Understanding Society (five waves from 2009/10 to 2013/14).

'Young people' were defined for the purposes of this study as those aged 17-29. It was also important to consider what happens to young people as they pass 30, and enter their 40s and even 50s, to see if there is any evidence that differences persist over time as they get older. The original motivation for the study was the observation of changes in car use, and much of the available evidence focuses on this, but consideration is also given as far as practical to changes in public transport use, walking, cycling and total travel. The period considered was from 1990 to the present day.

The sustained decline in car use among young adults

The trend for young adults to drive less than previous generations began approximately 25 years ago, starting with older members of the Generation X birth cohort and building up with the Generation Y / Millennial birth cohort and possibly continuing with the Generation Z / post-Millennial birth cohort. This is in contrast to Baby Boomers, born from 1946 to 1964, who were the spearhead of a rapid, prolonged and persistent growth in driver licence holding, car ownership and car use, which can be considered among the most important social trends in the UK from the 1960s to 1980s.

Driving licensing among young people peaked in 1992/4, with 48% of 17-20 year olds and 75% of 21-29 year olds holding a driving licence. By 2014, driving licence holding had fallen to 29% of 17-20 year olds and 63% of 21-29 year olds. Between 1995-99 and 2010-14 there was a 36% drop in the number of car driver trips per person made by people aged 17-29 with a fall of 44% for men and 26% for women. The difference in the amount of car driving between young women and young men became negligible by 2010-14. Young people generally travel less now, with the total number of trips per person made by young men falling by 28% between 1995-99 and 2010-14, whilst the number of trips made by young women fell by 24%. There has been a small increase in the number of trips per person on public transport. The number of walking trips per person has fallen whilst the number of cycling trips per person has remained broadly constant. As young adults have moved into their thirties, the proportion with driving licences and the amount they drive has increased, but not so much that their car use has caught up with that seen in previous

cohorts. Although there has been variation from year to year, the general trend has been for each cohort of young people since the early 1990s to own and use cars less than the preceding cohort, and for the growth in car use with age to also be at a lower rate. This suggests that their changing behaviour is more than just a postponement of driving.

Evidence from published literature

Earlier studies seeking to explain the differences in travel behaviour between Millennials and previous cohorts of young people have shown that these are partly explained by differences in life circumstances (in terms of demographics, living situation and socio-economic situation). For example, the lower full-time employment rates of Millennials explain some of the differences in travel behaviour. However, differences in life circumstances do not explain all of the observed differences - there are unexplained cohort effects. These could include differences in life circumstances which have not been captured in the studies (for example, the increase in low-wage, uncontracted jobs), but they could also include other factors.

Motoring costs have become a more significant factor discouraging driving amongst young people. Young people have seen stagnation in wage rates, increases in housing expenditure and a decline in disposable income that have not been experienced by older adults. In interviews, young people have often stated that the high costs of motoring, especially insurance costs, have discouraged them from learning to drive. There is also evidence of changes in the values and attitudes of young people. Surveys and interviews have shown that many young people accept not driving. It is unclear whether this reflects a generational shift in attitudes towards driving meaning that it is no longer considered desirable to drive by many young people, or that other changes mean that driving is no longer essential at this stage in life.

There has been much attention to increased use of Information and Communication Technologies (ICTs) in everyday life, although not yet a full picture of how this has affected travel behaviour. Effects have been noted which are in contradictory directions. However, this remains a plausible contributor to the fall in total travel by young people.

New secondary data analyses

Analysis of National Travel Survey time-series data for residents of England found large increases in time spent at home for men aged 17-29 (increase of 80 minutes per day) and for women aged 17-29 (increase of 40 minutes per day) between 1995 and 2014. Long-term change in the nature of employment and increasing use of ICTs are likely candidates to explain the trends.

Analysis of Census data for commuters in England for 2001 and 2011 provided evidence of substantial change in the commuting behaviours of 25-34 year olds, attributable to their living in more highly urbanised areas and this having a greater impact on their commuting choices than previously seen, with greater use of public transport.

Analysis of 'Understanding Society' data found that for young people being in full-time employment, or gaining employment, was strongly linked to then obtaining a driving licence. Stable employment across multiple years was a strong determinant of becoming a car driver. Forming a partnership was also positively associated with being a car driver. However, young people living with their parents were no less likely to be car drivers than people living alone or sharing with other adults - as such, the greater number of people living with their parents is unlikely to be a major factor leading to young adults driving

less. This analysis provides strong evidence to support the hypothesis that the fall in Generation X's and subsequent cohorts' car use relative to previous cohorts has been influenced by a long-term increase in the age at which people typically start working, begin relationships and have children.

Conclusions on the influence of societal trends and lifestyle changes on travel behaviour

The study has examined how demographic change, along with changes in the living and socio-economic situations of young people have influenced their travel behaviour. It has also examined the role of changes in young people's values and attitudes, and use of Information and Communication Technologies, such as smartphones. Finally, the direct influence of the transport system has been considered.

The evidence indicates that the causes of the changes in young people's travel behaviour lie largely outside transport. Changes in travel behaviour have been driven by changes in young people's socio-economic situations (increased higher education participation, rise of lower paid, less secure jobs and decline in disposable income) and living situations (decline in home ownership and re-urbanisation). These are long-term changes that predate the 2007-8 global economic crisis and subsequent recession. Closely tied to the changes in young people's socio-economic and living situations are changes in when people start a family, their social interactions (substituting face-to-face interaction with digital communication, for example) and the importance that people attach to driving. With the current evidence base it is not possible to quantify the importance of each of these factors or to say the order in which they began to exert an influence. They should be treated as interconnected phenomena.

The concept of a delayed transition, or even non-transition, into a traditional form of 'adulthood', marked by completing a course of education/training, leaving the parental home to live independently, getting a job, getting married and then having children, serves as a useful basis for considering the combined set of societal changes because it has been shown that car use is strongly associated with these markers of adulthood. However, it is important to explore the extent to which this 'delayed adulthood' has been a matter of choice or the consequence of constraints imposed by changes in labour and housing markets.

Changes in transport conditions have also played a role. There is good evidence that young people have been deterred from driving by high costs (especially car insurance costs). Reductions in driving and increases in public transport use have occurred to the greatest extent in London and other areas with high population density, where alternatives to driving are more readily available and there are greater constraints on driving. This demonstrates that transport policies and investments can shape long-term trends - although interventions in other policy areas (such as housing and employment) may be more influential in shaping young people's travel behaviour.

Future travel demand

When not only the speed but also the direction of social trends change, it is inevitable that there is greater uncertainty about the future. This report shows that changes in choices in early adulthood have long-term implications: the lower car use of young adults seen in the early 1990s is still seen in this cohort who are now in their forties. Those who start to drive later tend to drive less when they do start. Our expectation is that a modest change towards greater car ownership (or leasing) and use can be expected in the next 10-15 years for Millennials, although possibly only for those who secure stable, full-time employment. It thus seems reasonable to assume that the difference in travel behaviour

between those born before and after the early 1990s will be smaller at age 40 or 50 than it was at age 20 or 30. However, given that many young people have become accustomed to a lifestyle in which private car use is less central than it has been for previous generations, it is also likely that significant differences in travel behaviour will remain throughout their lives (representing a long-term cohort effect).

There are reasons to believe that this cohort effect is also likely to apply to the lives of subsequent cohorts. There is currently little evidence to suggest that the travel behaviour of the post-Millennial generation will be very different from those born in the 1980s and 1990s. If this is the case, what started as a cohort effect for Generation X and built up to the Millennials will become established as the new norm and represent an age effect where the development of travel behaviour over the life course differs for future generations from that which was seen prior to 1990.

It is important to recognise the new realities of the lives and travel behaviour of young adults when attempting to predict future transport use. In 2010-14, only 37% of 17-29 year olds reported driving a car in a typical week, whilst the figure was 46% in 1995-99. When forecasting future travel demand, it is important to be aware of the extent and pattern of car access within the population. There is a lack of data on the use of emerging transport options (shared mobility in particular) and it will be important to adapt survey and monitoring instruments to understand how these options are perceived and used by different age groups. There is the need to develop approaches that can generate scenarios for future travel demand which account for cohort differences in travel behaviour.

It is possible that the changes in young people's travel behaviour described above are the first phase of a social change that will continue through successive generations. The speed of that change is likely to be affected by the combined influence of: changes in the structure of the labour market and security of employment; urbanisation and land use; housing availability, location and tenure; career expectations; and demographic and taxation factors that affect how wealth moves between generations. Further, such social change is also likely to be affected by the interaction of all of these with: household formation; marriage and parenthood; and the specific ways in which new technologies are adopted by different groups. As a result, trends in behaviour do not necessarily instantly or simply reverse if *some of* the causal factors reverse. New habits are formed, and can be long lasting, as a response to, and influence on, these structural changes.

It is, therefore, difficult to envisage realistic scenarios in which all these future uncertainties combine in such a way as to re-establish earlier levels of car use. Growth in incomes, including amongst young adults, is widely assumed to resume in the long term. However, given the social change that has been taking place, this scenario would not necessarily lead to a return to the same level of car use among young adults as we have seen in older generations. Other structural changes have taken place and it is important to recognise their influence in travel demand forecasting alongside the uncertainties in macro-economic factors.

1. Introduction

Young adults in Great Britain and other countries are driving less now than young adults did in the early 1990s. The Department for Transport (DfT) commissioned the Centre for Transport and Society (UWE) and the Transport Studies Unit (University of Oxford) to carry out a systematic assessment of available evidence on the subject, both by review of UK and overseas published literature, and by new secondary analysis of existing UK data sets. The study sought to address the questions:

- In what ways have changes in young people's social and economic conditions, and lifestyles and attitudes impacted on their travel behaviour?
- How might those drivers, or other anticipated changes, be expected to impact their future travel demand?

This report sets out the main results obtained from the study. Altogether, 272 published references were identified, by search engines and direct correspondence with researchers working in the field, in the initial search stage. Three large data sets were analysed as part of the secondary analysis stage. Appendix A summarises the review methodology.

'Young people' were defined for the purposes of this study as those aged 17-29. It was also important to consider what happens to young people as they reach 30 to see if there was any evidence that differences persist over time as they get older. The original motivation for the study was the observation of changes in car use, and much of the available evidence focuses on this, but consideration is also given as far as practical to changes in public transport use, walking, cycling and total travel. The period considered was from 1990 to the present day.

Central to the study was to understand why recent cohorts of young adults (most discussed in relation to Millennials born in the 1980s and 1990s) differ from previous cohorts of young adults in their travel behaviour. This required distinguishing between age, period and cohort effects on travel behaviour. These are defined as follows:

- Age effects: variations associated with age that remain more or less stable over time;
- Period effects: variations over time that affect everyone alive at a given time; and
- Cohort effects: variations between groups of people born in different periods.

The report has five further chapters. Chapter 2 summarises trends in young people's travel behaviour, after which Chapter 3 summarises wider societal trends that have affected the lives of young people and interprets their significance. Chapter 4 summarises the findings from studies which have sought to explain the changes in young people's travel behaviour in various countries. Chapter 5 reports on findings from new analyses conducted in this project using existing available data sets. Finally, Chapter 6 provides a summary assessment of factors which have contributed to the observed changes in travel behaviour of young people and an interpretation of the process by which this has come about, with a cautious assessment about what this may imply for future trends and likely scenarios.

2. Trends in Travel Behaviour

This chapter presents a summary of the main trends for successive generations of young people in Great Britain since 1990 in driving licence acquisition, car access, the amount of travel in total and by each mode separately. The figures are based on published National Travel Survey (NTS) statistics and new analyses of NTS time series data¹.

2.1 Driving licences

Figure 1 (page 6) shows that a trend of reduced licence holding for young adult men can be traced back to the early 1990s. It indicates that peak licence holding for 17-20-year-old men occurred in 1992/94² at 55%, after which it fell to 29% by 2004, rose to 41% by 2007 and fell to 34% by 2014. **Figure 2** (page 6) shows a decline for 17-20-year-old women from a peak of 42% in 1992/94 to 25% in 2014. The overall outcome for both men and women has been that 29% of all 17-20 year olds had a full driving licence in 2014 compared to 48% in 1992/94. Less than two-thirds of 21-29 year olds had a full driving licence in 2014 (63%), compared to three-quarters in 1992/94 (75%).

Figures 3 and 4 (page 7) compare birth cohorts and how their licence holding has progressed over their lifetimes (the progressions of the same coloured lines from left to right). The vertical differences between lines represent the difference in licence holding between cohorts when they were of the same age. It shows men born in 1975-79 (late Generation X) did not acquire driving licences to the same extent as men born in 1970-74 and, similarly, men born in 1980-84 (early Millennials) did not acquire licences to the same extent as men born in 1975-79. The subsequent birth cohorts of men born in 1985-89 and 1990-94 have had similar licence holding progression as the cohort of men born in 1980-84.

Figure 4 shows greater similarity between the birth cohorts for women, although the 1980-84 cohort did not acquire driving licences to the extent of women born in 1975-79 and subsequent cohorts have had similar licence holding progression to the 1980-84 cohort. The 1980-84 birth cohorts (both men and women) had a lower rate of licence holding at 20 years of age than previous cohorts and the difference was maintained until 30 years of age. In other words, they did not catch up in licence holding with earlier birth cohorts by the time they were 30 years of age. It is not possible to say at this time what will happen when they get older, although **Figure 3** shows men born in 1975-79 maintained lower licence holding at 35 years of age.

2.2 Car access

Figures 5 to 8 (page 8) show that between 1995-99 and 2000-04 a substantial reduction occurred in the proportion of young adults who were able to drive a household car. There was a decrease from 46% of 17-20 year olds having a driving licence and car in their household in 1995-99 to 33% in 2010-14. Similarly, there were decreases from 63% to 51% for 21-24 year olds and 71% to 60% for 25-29 year olds. Across the whole age group (of 17-29-year-olds) there was a decrease from 62% having a driving licence and car in their household in 1995-99 to 50% in 2010-14.

¹ NTS has not historically collected data for Northern Ireland, hence consideration has often been limited to Great Britain (England, Scotland and Wales). Furthermore, the NTS has not collected data for Scotland and Wales since 2013, hence the latest trends could only be considered with respect to England.

² Since 2002 results from NTS have been reported annually. Prior to this sample sizes were smaller and results were reported for combined two or three year periods.

Contributing to this trend, there was an increase in the proportion of young adults living in a household with a car that they cannot drive themselves (related to more of them living with their parents and not getting a driving licence), as well as an increase in the proportion of young adults living in households without a car (especially among the older members of this age group).

Figures 5 to 8 (page 8) also show that there was a decrease from 33% of 17-20 year olds reporting driving a car³ in a typical week in 1995-99 to 23% in 2010-14 and decreases over the same period from 44% to 36% for 21-24 year olds and from 54% to 47% for 25-29 year olds. Across the whole age group (of 17-29-year-olds) there was a decrease from 46% reporting driving a car in 1995-99 to 37% in 2010-14. The reduction in the proportion of young drivers has been more pronounced for men than women (as with driving licences) such that gender differences were negligible by 2010-14.

2.3 Total travel

Figure 9 (page 9) shows that there has been a reduction in the average number of trips per person amongst the general population in the last twenty years for men and women of all ages. The greatest reductions occurred between 1995-99 and 2000-04. The reductions in trips have been especially pronounced for young adults, with 28% fewer trips for men aged 17-29 and 24% fewer trips for women (26% overall). The downward trend is also apparent for average distance travelled for men, and to a lesser extent for women (see **Figure 10**, page 9).

Men aged 17-20 made fewer work-related trips in 2014 than in 2002 (consistent with fewer of them being in work) and made fewer personal business, social and leisure trips. Men aged 21-29 made nearly as many work-related trips in 2014 as 2002 but substantially fewer personal business, social and leisure trips. Women in both these age groups made substantially fewer personal business, social and leisure trips in 2014 than in 2002.

2.4 Transport mode use

A large decrease in car driver trips has been the main contribution to the overall decrease in trips made by young adults. **Figure 11** (page 10) shows reductions in the average number of car driver trips per year of young men and women between 1995-99 and 2010-14. Reductions in car driver trips of 44% have occurred across the 17-29 year age group for men and 26% for women (36% overall). Young women made as many car driver trips per year as men in 2010-14. Older men of working age have also reduced how much they drive, which suggests there could be explanatory factors common to all men of working age.

Car passenger trips have decreased but not to the extent of car driving trips (see **Figure 12**, page 10). It is notable that 11-16 year olds were being driven about as frequently in 2010-14 as 1995-99 and hence the change in car use observed since the 1990s is a phenomenon that applies to those reaching driving age and not those younger than seventeen.

³ Car encompasses car and van. We have made reference to NTS seven-day travel diary data to identify whether individuals are drivers or not. If individuals reported at least one car driver trip then they were identified as a main driver if they had reported being the main driver of a household vehicle (in NTS interview) and as other driver if they had not reported being the main driver of a household vehicle.

Walking trips have decreased substantially in number, especially for women (see **Figure 13**, page 10). Cycling trips have been fairly stable (see **Figure 14**, page 10). Bus use⁴ of young adults has been fairly stable (see **Figure 15**, page 10), although a comparison of bus trips in London and elsewhere showed bus trips in London have grown (which may be linked to the introduction in 2005 of free bus travel passes for young people aged 18 and under living in London boroughs). Rail trips have increased for young adults but the increase is relatively small compared to the decrease in car driver trips (see **Figure 16**, page 10).

With regards to mode share, **Table 1** (below) shows that trips by public transport increased by 6 percentage points between 1995-97 and 2012 for 21-29 year olds with a 5 percentage point reduction in trips as car driver and 2 percentage point reduction in trips on foot. However, the absolute number of additional public transport trips was modest.

Table 1: Trips per Year by Mode for 21-29 Year Olds in Great Britain 1995/97 and 2012
(source: NTS0601 from DfT (2015))

<i>Mode</i>	<i>1995/7</i>	<i>Mode share (%)</i>	<i>2012</i>	<i>Mode share (%)</i>	<i>Change in % mode share</i>
Walk	312	25.6	213	24.1	-1.6
Bicycle	23	1.9	17	2.0	+0.1
Car/van driver	548	45.0	353	39.8	-5.1
Car/van passenger	197	16.2	148	16.7	+0.5
Bus	65	5.4	74	8.4	+3.0
Rail	40	3.3	54	6.1	+2.8
Other	32	2.7	26	2.9	+0.3
All modes	1218	100	886	100	-

2.5 Car driving distance

In terms of distance travelled, **Figure 17** (page 11) shows that there was a steady decrease in the number of miles driven by men in the period 1995-99 to 2010-14 and this applied to all ages below 60. Young women's car driving mileage has only decreased slightly (see **Figure 18**, page 11). As a result, the driving mileage of young men and women has converged.

Figures 19 and 20 (page 12) show car driving miles progression with age for different birth cohorts over the twenty year period from 1990-94 to 2010-14. For men it shows successive cohorts driving less. For example, men born in 1975-79 drove 3760 miles a year on average when they were 20-25 years of age (in 1995-99), while those born in 1990-94 drove 2030 miles (a 46% lower figure) when they were 20-25 years of age (in 2010-14). For the equivalent birth cohorts of women there was a 20% decrease in car mileage from 2200 miles a year to 1770 miles a year.

Table 2 below shows the trend in distance travelled by all modes for 21-29 year olds. It again shows a large reduction in distance travelled as a car driver and it also shows modest increases in bus and rail distance travelled.

⁴ Local and non-local bus use (including coach use).

Table 2: Distance in Miles per Year by Mode for 21-29 Year Olds in Great Britain 2002 and 2012
 (source: NTS0605 from DfT (2015))

<i>Mode</i>	<i>2002</i>	<i>2012</i>	<i>% change</i>
Walk	239	217	-9.4
Bicycle	49	53	+8.5
Car/van driver	4058	3060	-24.6
Car/van passenger	1745	1523	-12.7
Bus	449	497	+10.7
Rail	1008	1165	+12.6
Other	298	306	+2.5
All modes	7846	6791	-13.4

2.6 Summary

Compared to earlier cohorts, when they reach 30 years of age men born since 1980 have a substantially lower likelihood of having a driving licence and typically drive less. This cohort difference is also apparent for women but smaller in magnitude, and the turning point was later. In the next section we consider societal trends since 1990 and how they have affected the lives of young people.

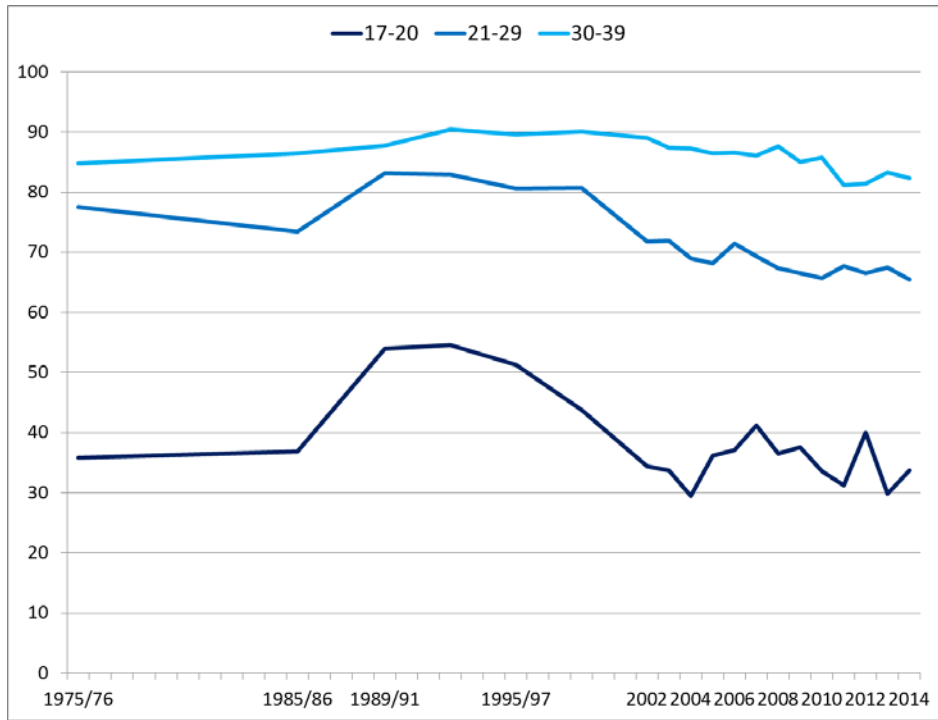


Figure 1: Percentage of Men with Driving Licence by Age Group in England 1975/76 to 2014 (source: NTS0201 from DfT (2015))

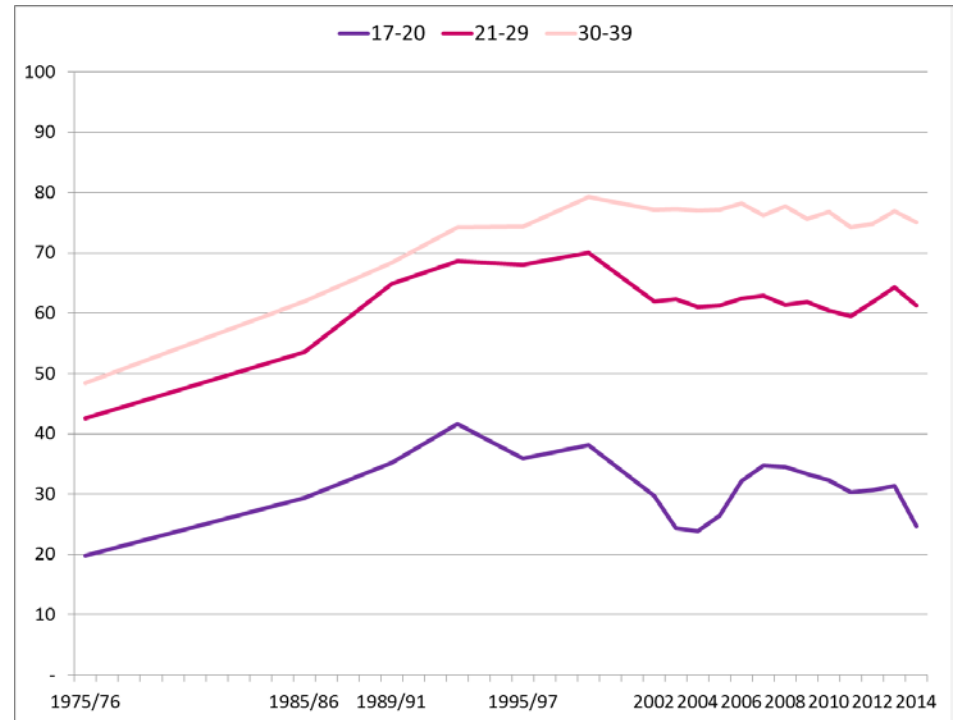


Figure 2: Percentage of Women with Driving Licence by Age Group in England 1975/76 to 2014 (source: NTS0201 from DfT (2015))

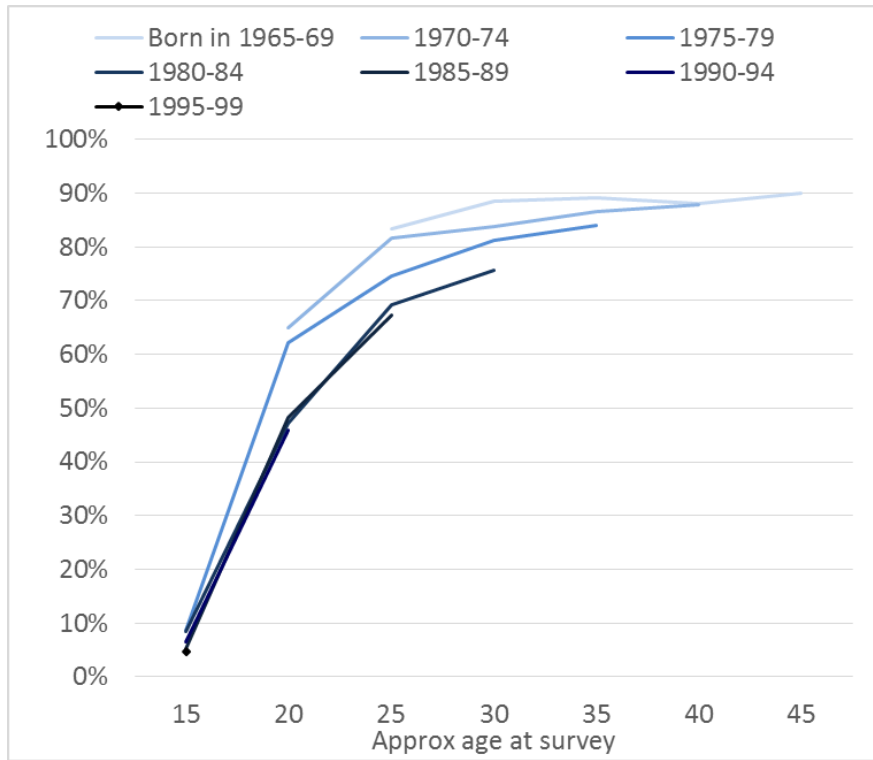


Figure 3: Licence Holding Progression with Age for Birth Cohorts of Men in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

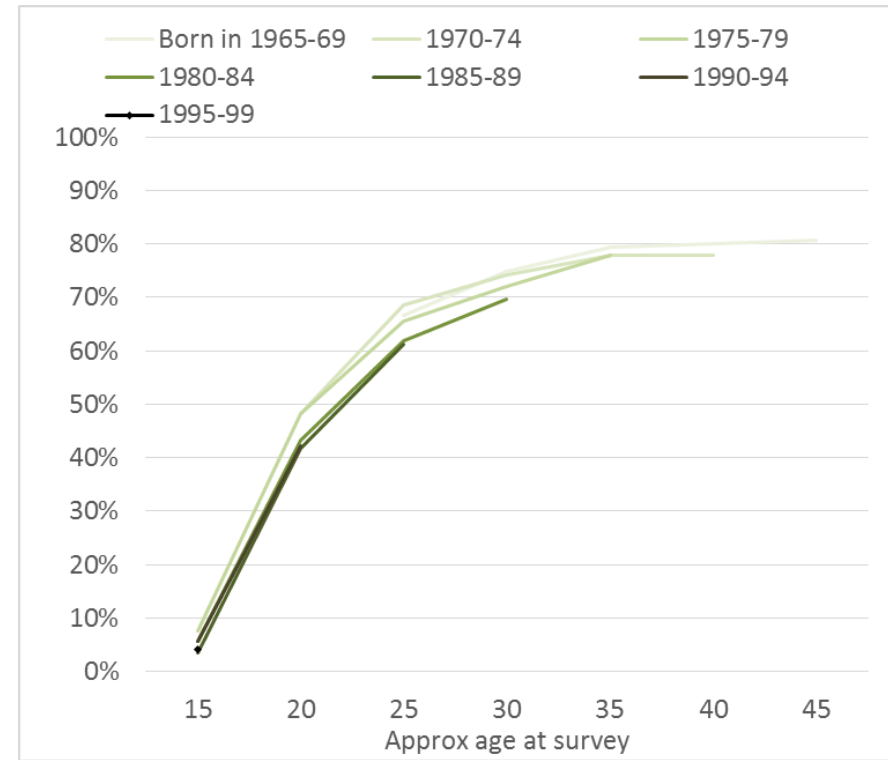


Figure 4: Licence Holding Progression with Age for Birth Cohorts of Women in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

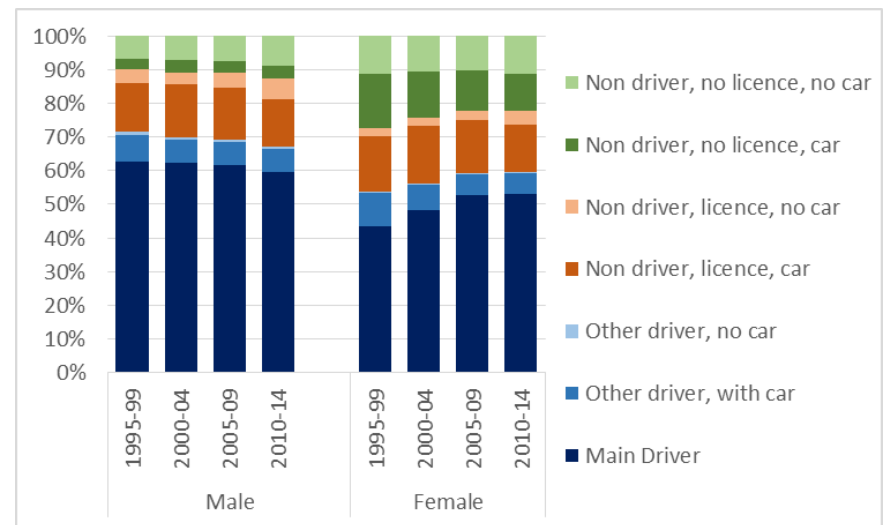
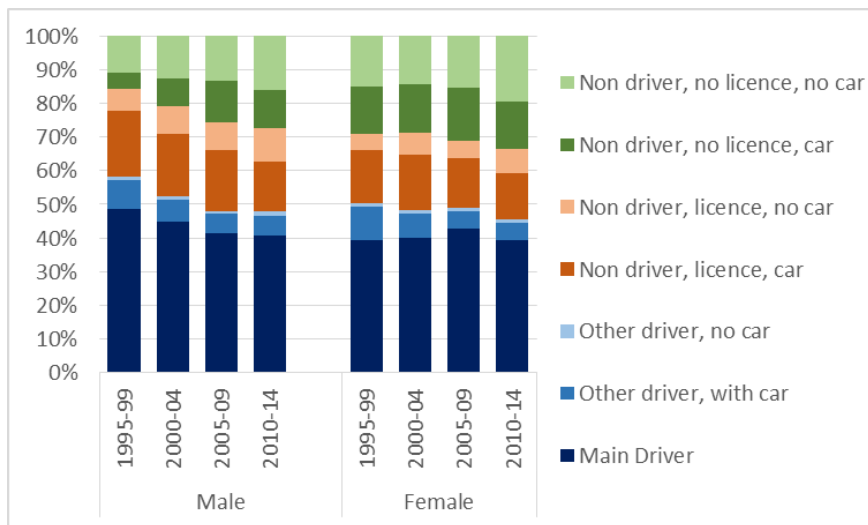
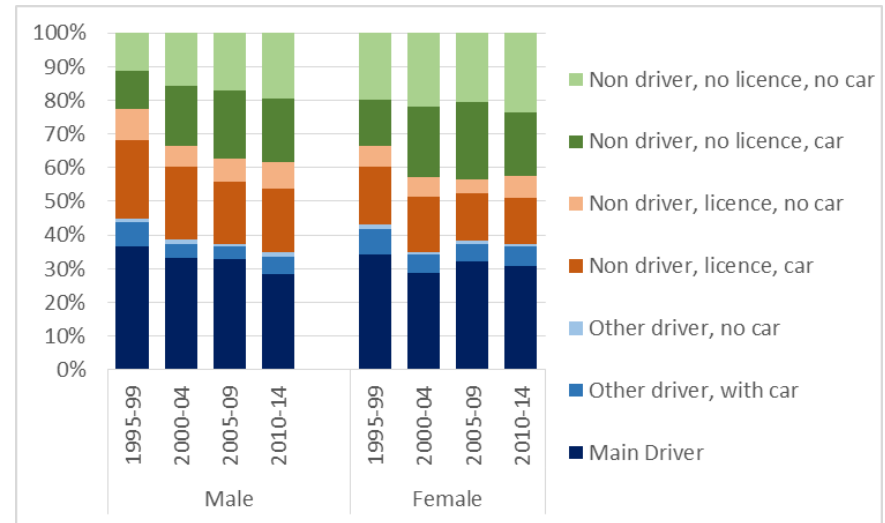
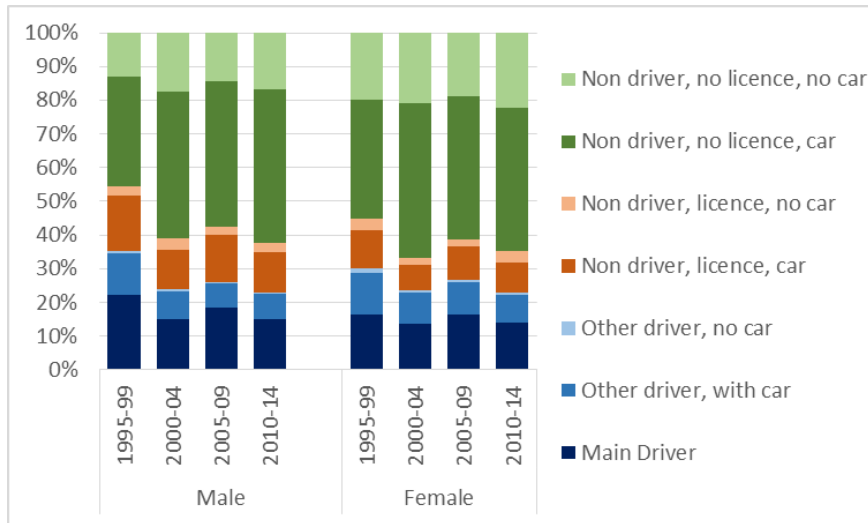


Figure 7: Personal Car Access for 25-29 Year Olds in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

Figure 8: Personal Car Access for 30-59 Year Olds in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

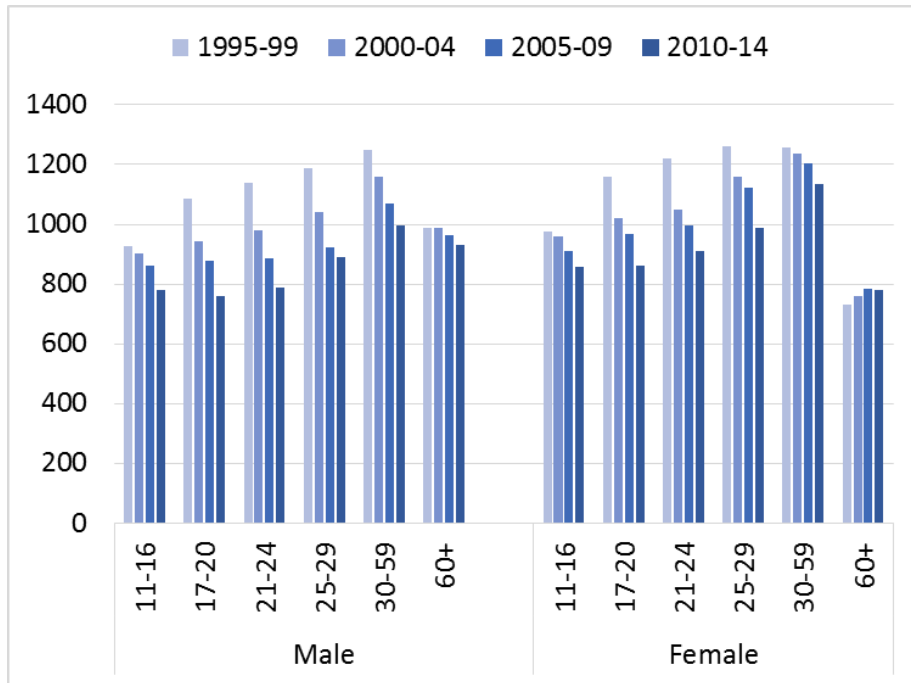


Figure 9: Trips per Person per Year by Age Group in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

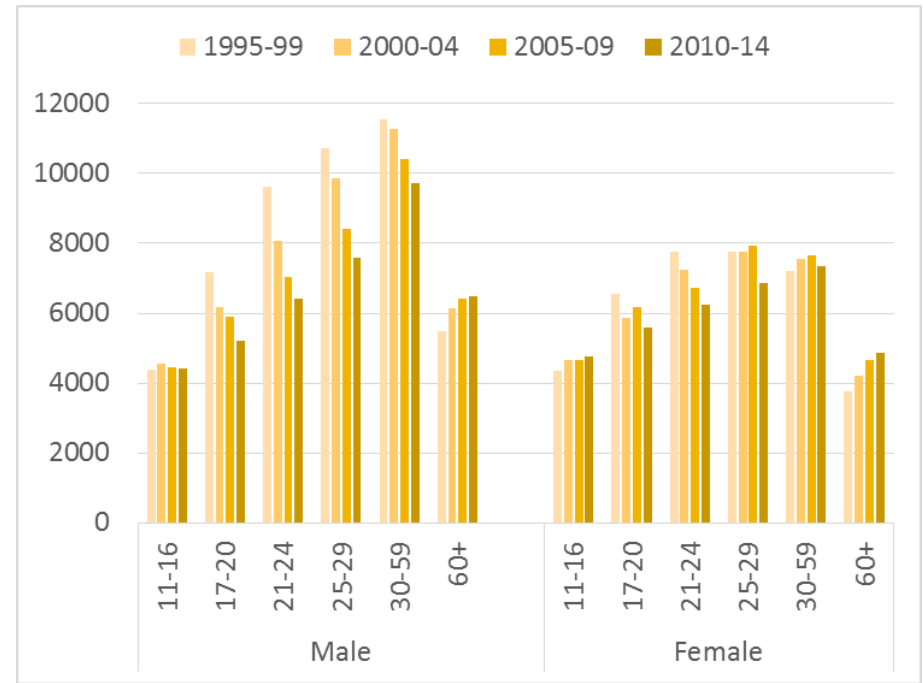


Figure 10: Distance Travelled per Person per Year by Age Group in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

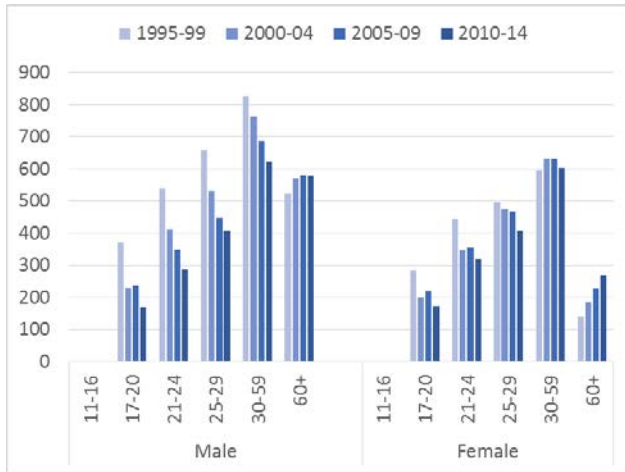


Figure 11: Average Number of Car Driver Trips per Year by Age Group in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

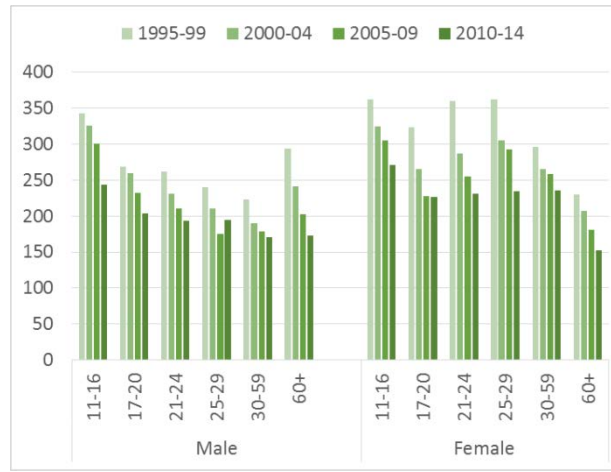


Figure 13: Average Number of Walking Trips per Year by Age Group in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

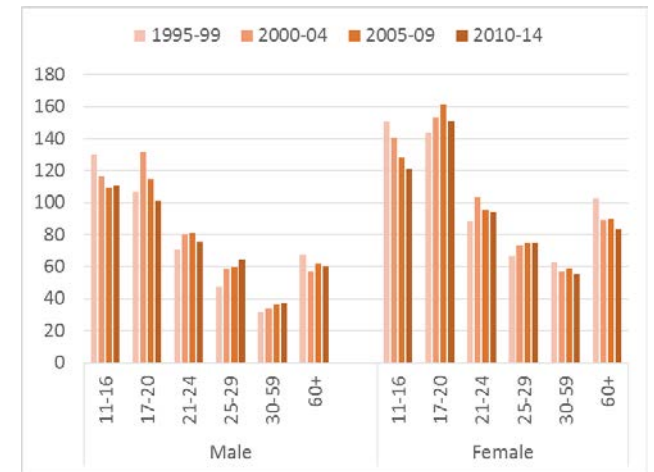


Figure 15: Average Number of Bus Trips per Year by Age Group in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

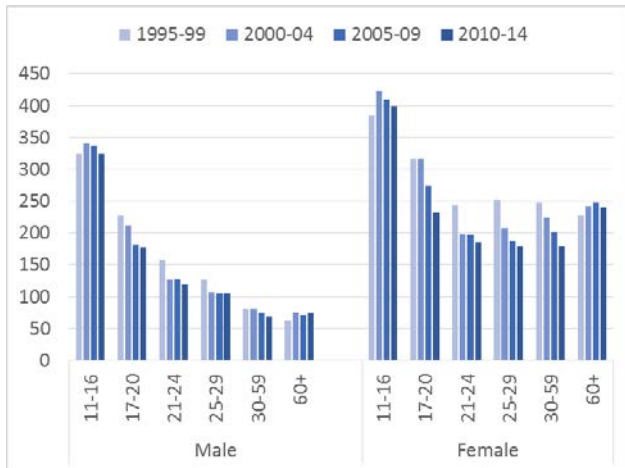


Figure 12: Average Number of Car Passenger Trips per Year by Age Group in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

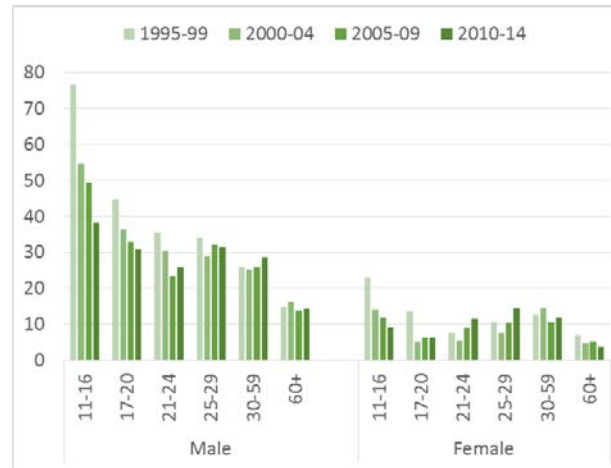


Figure 14: Average Number of Cycling Trips per Year by Age Group in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

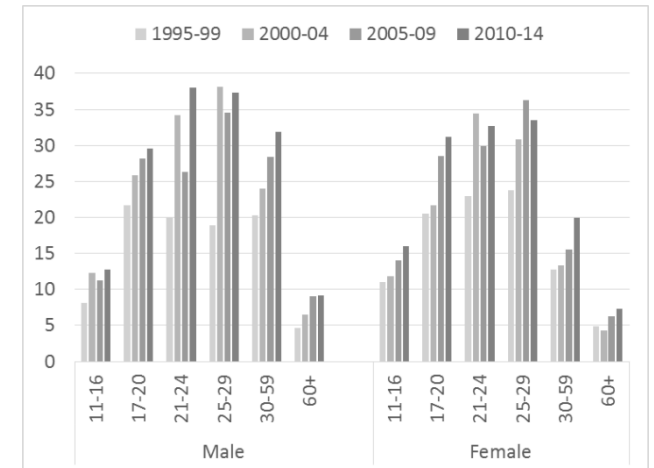


Figure 16: Average Number of Rail Trips per Year by Age Group in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

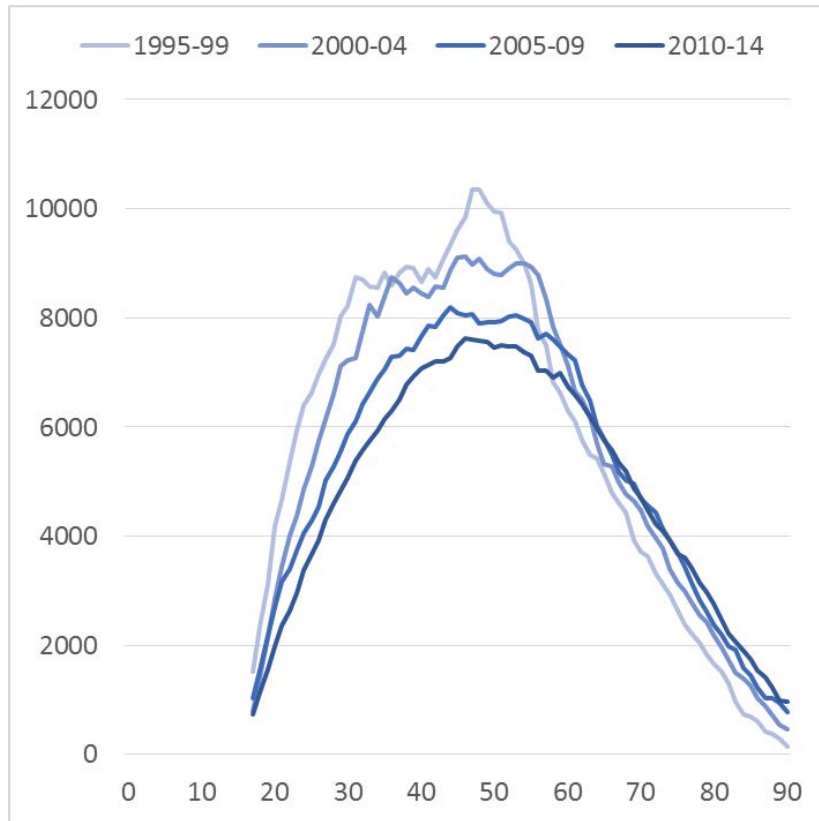


Figure 17: Average Car Driver Miles per Person per Year for Men by Age in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

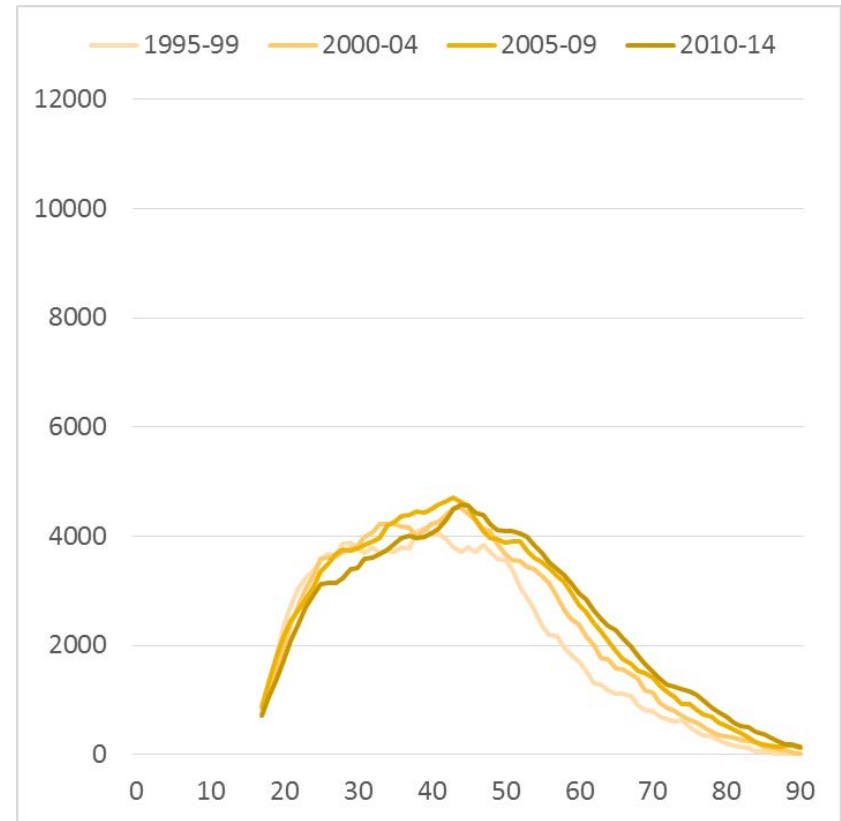


Figure 18: Average Car Driver Miles per Person per Year for Women by Age in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

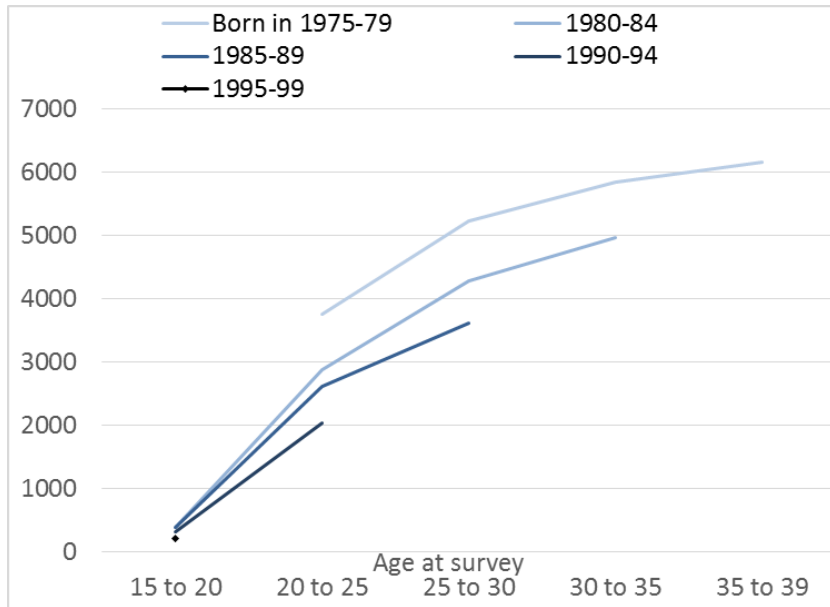


Figure 19: Car Driver Miles Progression with Age for Birth Cohorts of Men in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

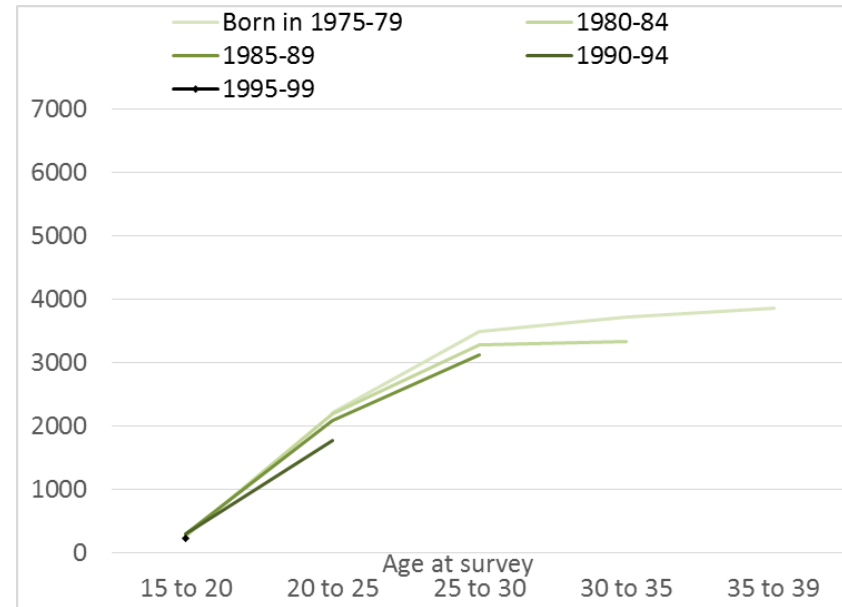


Figure 20: Car Driver Miles Progression with Age for Birth Cohorts of Women in England 1995-99 to 2010-14 (source: study's analysis of NTS data)

3. Societal Trends and Lifestyle Changes

This chapter gives an account of societal trends since 1990 and their effects on the lives of young people based on a review that went beyond transport literature into wider social science literature, both within and outside the UK. The trends examined were informed by suggestions made in the international literature of factors influencing young people's travel behaviour. It is important to note that the extent of evidence available in the published literature on these trends varied and for some trends there is considerable uncertainty.

3.1 Potential influences on young people's travel behaviour

In 2005, two papers were published that unexpectedly showed that young adults were less likely to have a driving licence than earlier generations. A paper by Barbara Noble, Chief Statistician at DfT, put the turning point at about 1993, observing that “[t]he proportion of young people with full car driving licences has been falling since about 1993” in Great Britain and found evidence to support all of the following hypotheses (Noble, 2005):

- the driving test has become more difficult;
- it has become more expensive to learn to drive;
- young people are choosing not to drive;
- young people have less need to drive; and
- some young people are driving, but without a licence.

Ruud and Nordbakke (2005) noted that driving licence rates and access to a car among young people aged between 18 and 24 years decreased in the 1990s in Norway and Sweden, and in large cities in Finland. The authors suggested that the lifestyles and identities of young people were becoming more diverse and “[f]or some, cars are still a central element in their lifestyle, for others they are nothing more than a means of transport”.

The end of the 2000s saw the emergence of a broader interest in whether long-term growth in car ownership and car use overall were showing signs of slowing, stabilising or reversing. Goodwin and Van Dender (2013) in the editorial for a special issue on ‘Peak Car’ in the journal *Transport Reviews* noted three⁵ common themes in the international papers in the special issue. The travel choices of young people were emphasised as the first of these three:

“There is now little doubt that the changing propensity of young people to drive is a very widespread phenomenon of great potential importance. There is not yet a common view on the reasons for this, but there continues to be great attention to lifestyle and attitudinal factors, as important factors in their own right or as modifiers of economic influences such as the cost of driving and youth employment opportunities”.

Four papers published in 2012-14 brought together international evidence on young people's travel behaviour trends. Sivak and Schoettle (2012) explored the relationship between driving licensing rates and socio-economic factors for 15 countries. Higher licence rates were associated with greater income per capita, higher median age of the overall population and a higher proportion of the population living in mega-cities, while a lower licence rate was associated with a higher proportion of Internet users. The authors

⁵ The other two were locational factors, especially the issues of urbanism and density but seen as affecting the whole population rather than specifically young people, and the continuing importance, but possibly changing strengths and mechanisms, of economic factors.

suggested this supported the hypothesis that the opportunity to communicate using new technology reduces the need for face-to-face contact among young people.

Delbosc and Currie (2013) published a synthesis of the evidence of declining driving licence holding across 14 countries. As well as reporting trends, they took account of causal factors suggested in source papers and organised these into six categories (life stage, affordability, location and transport, driver licensing regulations, attitudes, and e-communications). They assessed the evidence for each factor and concluded that “There are likely to be multiple interacting factors behind this trend and the combination of factors will vary between countries and even within cities”. Their view was that “the whole search for causal influences is confounded by a lack of longitudinal studies with enough scale to enable reliable measurement of the likely causal factors”.

Aretun and Nordbakke (2014) also conducted a review of the international literature on driver licensing trends. They concluded that “the decline in the driver’s licence rate among young people observed in many industrialised countries can be traced back to several factors”, and provided a list of causal factors similar to that of Delbosc and Currie.

Growing recognition of the phenomenon of a counter-trend in travel behaviour of young people prompted a major international comparative study to be commissioned in 2010 by BMW’s Institute for Mobility Research which considered a variety of travel behaviour indicators for six countries (IFMO, 2013). Explanations offered for the trends seen in the six countries were similar to those of Delbosc and Currie, and notably ICTs were considered to have had negligible impact as widespread use of mobile devices occurred *after* the reported trends had been underway for some years.

The causal factors proposed by Delbosc and Currie (2013), Aretun and Nordbakke (2014) and IFMO (2013) have informed the set of factors considered in this study and these are listed in **Table 3**. Trends in the UK with respect to these factors are summarised next.

Table 3: Potential Influences on Young People’s Travel Behaviour

Main Category	Specific Factors
Demographic situation	Postponing of parenthood Increase in cohabitation Migration to the UK
Living situation	Living with parents longer Decline in private home ownership Increased urbanisation
Socio-economic situation	Increased participation in higher education Increase in women’s labour force participation Increased work in the service sector Increase in low-waged, uncontracted work Decline in disposable income
ICTs	Increased ICT use Use of mobile devices to arrange everyday life ICT use whilst travelling on public transport Increase in gaming
Values and attitudes	Extended youth Rise of pro-environmental attitudes Decline in cars as status symbols
Transport and mobility	Improvements in public transport Stricter driver licensing regime Increased car insurance costs Increased spending on transport Rise of shared mobility

3.2 Demographic situation

3.2.1 Postponing of parenthood

A growing share of young women in the UK are childless at the age of 30 (Berrington and McGowan, 2015), and the average age for a woman to have her first child has been increasing since 1970 (Campbell et al., 2014). These trends appear to have stopped about 2005 with the proportion of those childless at 30 peaking for women born in the mid-1970s.

For young adults aged 18-25, parenthood is very strongly associated with economic disadvantage (Dariotis et al., 2011). Foreign-born women have higher fertility rates overall than UK-born women (Robards and Berrington, 2015) and women with Higher Education (HE) are twice as likely to remain childless compared to women with low educational attainment (Berrington and McGowan, 2015).

3.2.2 Increase in cohabitation

Of those who get married, 60% live together first but living together without getting married is increasingly an alternative to marriage (Feijten and van Ham, 2010). However, it has been shown that those who are married are more likely to stay together. The share of young adults who leave the parental home in order to immediately form their own families has declined since the 1990s. As a result, the family-formation pathways of young adults are often shaped by one or several separations from partners (Feijten and van Ham, 2010).

The number of people living alone increased by 23% between 2005 and 2015, but this increase took place in the 45-64 age group; among 16-24 year-olds, the number of those living alone decreased by 9% over the same period (Feijten and van Ham, 2010). Approximately 9% of the UK adult population are in a relationship with a partner with whom they do not cohabit but the prevalence of Living Apart Together (LAT) has remained relatively stable between 2006 and 2011 (Duncan et al., 2014).

3.2.3 Migration to the UK

Migration to the UK increased from 266,000 people in 1993 to 632,000 in 2014 (ONS, 2015a) with EU citizens accounting for about half of all migrant arrivals to the UK in 2014. Young adults account for a significant share of inward migration flows; the share of 15-24 year olds rose from about 32% in 1991 to 44% in 2013 (Vargas-Silva and Markaki, 2015). Of 16-34 year olds covered by the Labour Force Survey, 8% were born outside the UK in 1998 and 17% in 2008.

Among inward migrants there are both highly qualified and less qualified young adults (Burell, 2010). A significant number come to the UK for the purposes of HE (ONS, 2016). London has historically been the most favoured destination for inward migrants. The absolute levels of migration into London have increased over time, but London's share of the total has declined, from a peak of 48% in 1998 to 30% in 2013. Foreign-born residents, like young adults, tend to live in city centres where they made up 35% of the population in 2011, compared to 18% in suburbs and 7% in rural areas (Thomas et al., 2015).

3.3 Living situation

3.3.1 Living with parents longer

The number of 15-34 year olds in the UK living with their parents increased between 1996 and 2015 from 5.76 to 6.61 million. This represents an increase from 41% of men and 30% of women in this age group in 1996, to 44% and 35% in 2015 respectively (ONS, 2015b).

Until the age of 30, a mix of levels of education and employment status can be observed among those living with their parents. For those aged 30-34, however, it is the unemployed or those without a post-secondary qualification who are more likely to be living with parents.

Major life events, such as leaving full-time education, becoming unemployed or relationship breakdown, result in an increased probability of young adults returning to the parental home (Stone et al., 2014). Notions of ‘shame’ and ‘failure’ are increasingly being replaced by widespread recognition of returning to the parental home as a viable pathway (Stone et al., 2014), with societal acceptance encouraging more young adults to plan such returns.

In an increasing number of cases, young adults may be unable to move out of the parental home even after they form their own families. This may be due to the need for inter-generational care (caring for older parents, grandparents helping with childcare), but it is most likely to be the outcome of economic necessity. Data on this type of living arrangement (more than two generations of the same family sharing housing) is collected by the ONS under the category of ‘concealed families’. There were 289,000 concealed families in England and Wales in 2011 according to Census data, a 70% increase on 2001 (ONS, 2014).

3.3.2 Decline in private home ownership

Young adults who have moved out of the parental home are increasingly renting homes in the private rented sector. They have become more likely than other age groups to be in this sector and are especially likely to live in shared accommodation. Many commentators therefore refer to ‘generation rent’ when discussing young people in the housing market (Dorling, 2015). The UK had the highest share of young adults living in shared accommodation (10%) of 14 European countries⁶ analysed in the years 2005-11 (Arundel and Ronald, 2016). These trends are related to structural changes in the housing market. Prominent among these are (Berrington and Stone, 2013):

- decline in availability of social housing for single people under the age of 35;
- reduction since 2012 in housing benefits for under 35 year olds; and
- increased cost of housing.

It is anticipated that there will be an increase in the number of young adults living in shared private accommodation with non-family members in high-density locations into their late 20s and early 30s (Rugg and Quilgars, 2015). A number of studies has also identified a cultural shift in relation to shared private housing. It has come to be seen by many young adults, particularly higher education graduates, as an experience of independence to which they look forward (Arundel and Ronald, 2016).

The importance of remaining in, or returning to, the parental home is evident from a study by Clapham et al. (2014) who developed a typology of housing pathways from an analysis of the life development of 458 British 16-21-year-old adults in the period 1999/2000 - 2008/9. They estimated that in 2008/9 there were 4.7m 25-30 year olds living with their parents in the UK (53% of the total of this age group), with 3.7m (42%) doing so to save money to buy a house in the future and 1m (11%) waiting for social housing to become available.

⁶ Countries studied were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

3.3.3 Increased urbanisation

Young adults are more likely to migrate between regions and move home more frequently than other age groups (Clark and Dieleman, 1996; Champion and Shuttleworth, 2015). Multivariate analyses show substantial variation in inclination to move house among young adults, particularly between owner occupiers (low) and private renters (very high) and according to educational attainment, employment status and occupation (Champion and Shuttleworth, 2015).

Within England, the population shift from urban to rural areas has stopped and reversed (Headicar, 2013; Metz, 2015). This is not true in Scotland, where the proportion of the population living in urban areas has not risen (Evans and Unsworth, 2013). Between 1981 and 1991 major UK cities lost population, whilst small towns and rural areas grew strongly (Champion, 2014). The process stabilised after 1991 and reversed after 2001, when major cities - particularly London - grew most strongly. National Travel Survey data suggests that the proportion of young adults aged 17-29 living in London and other metropolitan areas increased from 27% to 34% between 1995 and 2010 (Chen et al., 2014).

The renaissance of larger cities has been accompanied by a population shift within cities, towards city centres and inner areas. The population share of the densest wards in England and Wales (over 11,000 people per square mile, roughly the densest quartile in 2001) increased by four percentage points between 2001 and 2011 at the expense of all other wards (Melia, 2016). There was an overall increase of 37% between 2001 and 2011 in the population of city centres in England and Wales which was “driven primarily by the city centres of large cities, and by young, highly educated, single residents” (Thomas et al., 2015).

This review found little hard evidence on why a greater proportion of young adults moves to and lives in more urbanised areas in the UK or avoids relocating to lower-density settings. Increasing participation in higher education is part of the explanation because most universities are located in major urban centres. There has been some controversy in the literature over whether the repopulation of city centres reflects the preferences of potential residents or simply the unavailability of housing elsewhere (Evans and Unsworth, 2012; Goodchild, 2013).

3.4 Socio-economic situation

3.4.1 Increased participation in higher education

The shift in participation from waged work to education among young people in the UK has been one of the defining changes in young people’s lives in recent decades. This trend is partly a consequence of a structural transformation in the UK’s economy as the rise of a post-industrial, knowledge economy demanded better educated employees (Furlong, 2015; McDowell, 2016). **Figure 21** below shows that a decline in employment rates of 15-19 year olds can be observed since the early 1990s. It occurs across all regions of the UK, including those with high unemployment rates due to deindustrialisation, and among both young men and women. For women aged 25-29 overall participation in the labour market has risen since the 1950s.

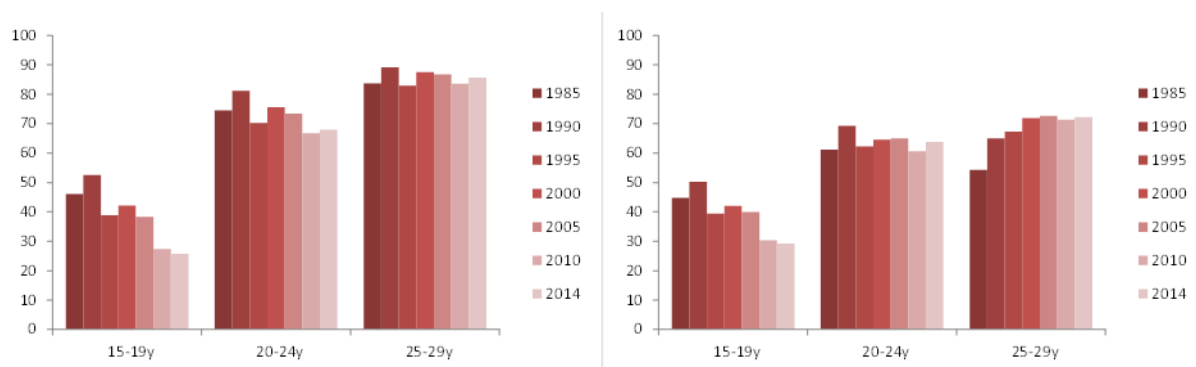


Figure 21: Employment Rates of Young Men (Left) and Women (Right) in UK 1985 to 2014 (source: Eurostat (2016))

Participation in education, particularly higher education (HE), has increased from 15% in 1988 to 32% in 1994 (Chowdry et al., 2010) and grew further to 38% in 2010/11 (HEFCE, 2013). Much of the increase was due to the greater participation of women: the proportion of HE students who were women grew from 30% in 1971 to 57% in 2008 (Berrington and Stone, 2013). A consequence of increased education participation and expectations is qualification inflation, which makes it more difficult for higher-education graduates to find employment at their level of qualification (Furlong, 2015): more than 40% are in low-skilled employment six months after graduation, and this statistic only drops to 25% by 3.5 years after graduation (Mosca and Wright, 2011).

Increased HE participation is not the only explanation for the decline in youth employment. Other causes are the rise of low-wage, uncontracted work (see 3.4.4) and the economic downturn since 2008. There has been particular interest in those young people classified as NEET (Not in Education, Employment, or Training). This is a varied group (Furlong, 2015), mostly made up of unemployed young people but also including those who are unavailable to work, those waiting for better employment opportunities, those disengaged from seeking employment and those engaged with personal development activities. The Office for National Statistics estimated that in April-June 2017 11% of people in the UK aged 16-24 (790,000) were in this NEET category, and that 41% of these were looking for work and available for work (ONS, 2017).

3.4.2 Increase in women's labour force participation

Figure 21 above indicates that labour force participation among women aged 25-29 rose from 1985 until approximately 2000, after which it stabilised at a level 10-15 percentage points below men in the same age category. Since the 1950s women in a couple and/or with children have increasingly taken up paid work, often to enable lifestyles characterised by rising standards of living, home ownership and demand for consumer goods (McDowell, 2009, 2016). However, long-term growth in public sector jobs was reversed in 2010, and, with women more likely than men to be employed in the public sector, this is one reason behind popular claims that women have been affected particularly adversely by the 2007/8 financial crisis and subsequent recession (McDowell, 2014).

3.4.3 Increased work in the service sector

Since the 1950s, the UK has undergone a process of deindustrialisation and seen the rise of the service economy. Polarisation has occurred within the service sector, with the number of jobs growing more rapidly at the top and bottom of the occupational ladder since the 1970s. At the top, the growth has been in higher-skilled service jobs that are part of the knowledge economy and value particular mental skills such as calculation and providing considered opinion (McDowell, 2016). At the bottom, growth has occurred in lower-skilled service jobs - typically interactive work associated with serving and caring for others

(McDowell, 2014, 2016). Part of this growth reflects the commodification and marketisation of unpaid work previously undertaken in the home, typically by women (e.g. childcare, cleaning), as well as the wider growth of the hospitality and leisure sectors (e.g. cafes, retail and tourism). Young people are particularly likely to be employed in the hospitality and leisure sectors (Furlong, 2015), which have also absorbed large numbers of overqualified graduates and migrants.

Higher skilled knowledge-economy jobs are increasingly concentrated in cities, along the main transport corridors and in city centres, while lower skilled service jobs are dispersing out of city centres (Sassen, 2001; Davis and Henderson, 2008; Tochtermann and Clayton, 2011). The concentration of knowledge economy jobs in cities is one relevant factor attracting young adults towards urban living.

Young men and women have been affected differently by the rise and polarisation of the service sector. Young working class men are now one of the most vulnerable groups in the labour market (McDowell, 2014). Not only have these young men been deprived of opportunities in which many would traditionally have found waged work, they are also often regarded by employers as less suited for lower-paid work in the service sector (e.g. retail, hospitality) because of the social skills and customer focus such work tends to require (McDowell, 2014). However, whilst the rise of service work has “open[ed] up the world of work to millions of women, providing wages and a degree of economic independence”, it should be noted that women are often paid less well than men in comparable jobs (McDowell, 2016).

3.4.4 Increase in low-waged, uncontracted work

The trend towards low-waged, uncontracted work (or ‘precarious employment’) is often attributed to the economic downturn since 2007/8, but it goes back to at least the 1990s and needs to be seen as the outcome of a broader drive for flexibility among employers in the private, public and third sectors. For many social scientists (Standing, 2013; McDowell, 2014; Furlong, 2015), the growth in low-waged, uncontracted work has become a more pressing economic issue than unemployment.

Standing (2011) has famously argued that this growth has resulted in the formation of a new class - the precariat. For Standing, the precariat stretches across educational classes; it includes both those with no or low qualifications, often across generations, and the ‘newly precarious’ highly educated in the knowledge economy, many of whom are young. A stricter definition reserves this label for the poorest and most deprived - estimated to be about 15% of the UK population - with low economic capital (income, wealth), low cultural capital (the credentials and customs acquired through education, ability to appreciate and engage with cultural goods) and low social capital (resources and connections embedded in social networks)(Savage, 2015).

Economic precariousness is difficult to measure quantitatively. A popular measure relates to the number of workers on zero-hour contracts. These increased between 2004 and 2011 and rose by 50% between 2012 and 2013, with young people the most likely to hold such contracts (Standing, 2013). Another indicator of precariousness relates to underemployment - working fewer hours than one would like. Bell and Blanchflower (2013) have constructed a composite underemployment index for the UK which measures excess labour capacity in terms of both people (unemployed) and hours (underemployed). Analysis of 2008-2012 Labour Force Survey data demonstrates a greater increase in their composite underemployment index than in the unemployment rate in the general population. Not only are unemployment, and especially underemployment, highest amongst the young, this group has also experienced the steepest increase in both unemployment and underemployment of all age categories. Among 16-24 year -olds, labour supply in hours exceeded employment on offer by 30% in 2012. This statistic stands in sharp contrast with

that for workers aged 50 and more, many of whom would like to work less than they actually do.

Economic precariousness is less of a problem for young adults with greater educational attainment. Leaving the education system and entering the labour market before the age of 20 strongly increases the risk of precariousness and it is higher for youth from lower social classes (Furlong et al., 2012).

3.4.5 Decline in disposable income

Between 1997 and 2012, median gross weekly wages fell by about one fifth (19%) in real terms for workers aged 18-21 and rose by 2% for 22-29 year olds (Kingman and Seager, 2014). Over the same period, the over 50s have experienced a 25% rise, resulting in a widening of the ‘intergenerational pay gap’ by more than 50% (Kingman and Seager, 2014).

Age differences in disposable income are partly a consequence of age differences in spending on housing, the largest cost to the average household. Households headed by a person younger than 30 have spent the largest amounts on housing throughout the 2001-2014 period, and those households are significantly worse off than other age categories (see Table 4). After correction for inflation, the youngest households have seen the largest increase in absolute housing costs (+£32.90) and share of housing in total expenditure (+7.9 percentage points) between 2001 and 2014. This means that the intergenerational gap in income has increased even more than Kingman and Seager (2014) suggest.

In 2007/8, 15-24 year olds in rural areas had a substantial pay disadvantage compared to their urban peers (Culliney, 2014). At that time income was lower among young women than men and increased with social capital (the resources young individuals can access through social networks), age and parental class.

Table 4: Average Weekly Expenditure on Housing¹ by Age Group of the Household Reference Person in UK 2001/2 to 2014 (source: Living Costs and Food Survey (2016))

	Under 30 years		30-49 years		50-64 years		65-74 years		75+ years	
	£ ²	% ³	£ ²	% ³	£ ²	% ³	£ ²	% ³	£ ²	% ³
2001/2	87.7	14.9	55.4	7.6	47.4	7.5	42.0	11.0	37.7	14.9
2005/6	94.8	17.1	65.1	8.6	54.0	8.5	42.5	10.1	39.9	15.5
2007	104.6	18.4	69.9	10.0	59.4	9.6	45.1	11.3	44.0	16.3
2008	90.7	17.2	71.0	10.2	58.5	9.6	50.1	11.9	43.0	16.7
2011	104.6	21.6	77.8	12.3	60.9	10.8	50.7	12.9	45.0	15.2
2014	120.5	22.8	82.7	13.5	62.0	10.8	60.3	11.9	48.6	16.3

¹ Spending on housing (excluding mortgage interest payments, council tax and Northern Ireland rates, as well as housing insurance and purchase/alteration of dwelling or mortgage), power and fuel (excluding transport)
² Real prices, inflation correction based on the Bank of England’s inflation calculator (BoE, 2016)
³ Percentage of average total weekly expenditure (calculated by the authors)

3.5 Information and Communication Technologies

3.5.1 Increased ICT use

Use of ICTs has both increased and changed rapidly. The main use of a phone, for instance, is no longer calling people but has now shifted to internet-based social networking, entertainment and browsing the internet. Young people are frontrunners in these changes, in part because they have led in smartphone adoption (see Table 5 below), and are much more attached to their smartphone, which often has a personal meaning to them (OFCOM, 2015).

Table 5: Smartphone Adoption by Age Group in UK 2012 to 2015 (source: OFCOM (2015))

	16-24 years	25-34 years	35-54 years	55-64 years	65+ years
2012	66%	60%	43%	19%	5%
2013	77%	73%	60%	32%	8%
2014	88%	84%	72%	39%	14%
2015	90%	87%	80%	50%	18%

However, the notion that all young people fall in the category of ‘digital natives’ has been challenged (Hargittai, 2010; Boyd, 2014). It is argued that a wide spectrum of ICT use, interest and ability exists among young people. There are also many different factors shaping young people’s access to and interest in ICT, including socio-economic status, gender, and parent/carer/educator gatekeepers (Henderson et al., 2002; Hargittai, 2010; Abeele et al., 2014; Smith et al., 2015). This means that not all young people use technology in the same way.

For some teens and young adults, ICTs offer an alternative ‘public space’ in which they can express themselves in ways which supplement their daily social interactions. Yet, ICT use does not replace friendships formed through face-to-face interaction, but adds another layer to these interactions when people are not able to be with each other (e.g. outside of school/college or when unable to attend an event) (Thulin and Vilhelmson, 2007; Boyd, 2014; OFCOM, 2015).

3.5.2 Use of mobile devices to arrange everyday life

Young people use ICTs to satisfy different needs, which can be affected by where they live, the availability of transport connections, the proximity of social networks and the use of public space. An early study into mobile phone use showed how location shaped the perceived need for detailed coordination to make social arrangements (Henderson et al., 2002). Young people living in a working-class urban area in Northern Ireland were less likely to use a mobile phone for making social arrangements than those living in a more affluent rural area of south-east England. Those living in the urban area were more likely to live near others in their social network and have a culture of spontaneously visiting to socialise without phoning/texting ahead. In contrast, for those in the rural area face-to-face social interaction was less spontaneous because of the need to make travel arrangements. Here mobile phones were central to supporting such social meetings, not only to identify where people were meeting but organising how to get there. A study of the role of mobile phones and social media in the social co-ordination of teens’ lives in a US suburban context found that having access to a car or getting lifts by parents/friends are still essential to young people’s activities and travel outside of school (Cope and Lee, 2016).

Getting around may be assisted by technology, with young people increasingly reliant on GPS and apps to get them from A to B on different transport modes, including walking (Leyshon et al., 2013). Millennials in the ‘California Millennials Dataset’ have been found to use smartphones more than Generation X to help them get around (finding destinations, modes, routes, checking traffic conditions and navigating in real time) (Circella et al., 2016). At the same time, young people sometimes use the phone to contact someone who knows more (e.g. parent) to affirm/provide directions.

Parents, in combination with society’s expectations, also constrain teenagers in their freedom to spend time unsupervised in public spaces. In North America, a shift seems to be occurring so that teenagers are spending less time in ‘real’ public spaces - ‘hanging out’ in the shopping mall, street corner, park, etc. - and more time in ‘virtual’ public spaces,

such as Instagram and Facebook (Boyd, 2014). This shift reflects teenagers being viewed both as potential criminals and victims of crime. It means that hanging out in the new virtual public spaces is becoming normal for many. Nonetheless, young people do go out of the house alone and often having the mobile phone provides reassurance to parents that their children can be tracked and monitored for their safety (Leyshon et al., 2013; Boyd, 2014).

3.5.3 ICT use whilst travelling on public transport

The literature on young people's ICT use whilst travelling is limited. From the scant evidence available it is difficult to infer how important ICTs are in making public transport travel more attractive to young people. Focus groups with young people in London and Brighton suggested that being able to do something else whilst travelling is not an important factor influencing their decision to use public transport (Pawlak et al., 2015). Younger people on buses in Bristol are more likely to be bored than older passengers and dissatisfied with the experience even though the former are using ICTs more (Clayton et al., 2016). It has been found from a 'California Millennials Dataset' that Millennial respondents are more concerned about being connected online everywhere they go than Generation X respondents (Circella et al., 2016).

3.5.4 Increase in gaming

The literature on video gaming is rapidly growing but mainly considers school-age children. Most relevant to the debate on changes in travel behaviour is research on the number of hours spent gaming and the impact on social networks. It was found that the number of boys and young men aged 18 and under who played video games for at least two hours per weekday increased from 42% to 55% between 2006 and 2010 and for girls from 14% to 20% (Brooks et al., 2016). Time spent gaming was greater among early teens and it was argued that gaming practices are part of the process of growing up and become less important as people start to spend more time on further study or working.

3.6 Values and attitudes⁷

3.6.1 Extended youth

Sociologists have identified five traditional markers of adulthood: completing education, moving out of the parental home, getting a job, getting married, and then having a child. At the end of the 20th century, they noted that young people were taking longer on average to achieve those markers and that the markers were increasingly being combined in new ways (Shanahan, 2000). Based on interviews with some 300 young Americans, Arnett proposed a new developmental stage termed 'emerging adulthood' between adolescence and adulthood - roughly the ages 18-25 - characterised by the postponement of the commitments that have been typically associated with adult life. This is effectively an extension of youth which can be distinguished by the following five elements (Arnett, 2006):

⁷ Values are life goals or standards that serve as guiding principles in life (e.g. security, benevolence). They provide the basis for the formation of attitudes (evaluative responses such as liking or disliking) to specific attitude objects such as using methods of transport.

- Identity exploration;
- Trying out new possibilities in love and work;
- Instability;
- Self focus; and
- Feeling in-between (adolescence and adulthood).

Whilst the ‘emerging adulthood’ concept has become very influential and could explain some changes in travel behaviour, it has also been criticised extensively (Bynner, 2005; Côté, 2014). Critics hold that Arnett privileged individual choice over structural influences, failing to recognise that the behaviours of emerging adults are also driven by broader social and economic changes, including declining and insecure incomes for many young people. Regardless of what has driven this development, it is important for the present study to consider how it has influenced the travel behaviour of young adults.

3.6.2 Rise of pro-environmental attitudes

Whilst it is a common assumption, there is little evidence to suggest that young adults are very different to older adults in their environmental attitudes.

There is diverse literature on the links between environmental attitudes and travel behaviour, but only a small part of this focuses on young people. Focus groups with children aged 11-18 in suburbs and outlying semi-rural towns and villages of Bristol found study participants were aware of global environmental issues, but less so about how they might influence these as individuals (Line et al., 2012). The car remained a central practical part of the everyday organisation of their lives and was seen as necessary in the future to sustain lifestyle choices. Environmental attitudes may change as young people move away from home and go to university. It has been found that young people develop stronger pro-environmental values after starting university which it is suggested could relate to the wider university culture and having a new peer group (Cotton and Alcock, 2013).

However, using the 2009 British Social Attitudes Survey to compare the youngest age group (18-34) to the rest of the British population reveals that the 18-34 age group was only slightly more likely to agree that ‘car use has a serious effect on climate change’ (75% for 18-34 year olds compared to 73% for all people) and less likely to be ‘concerned about effect of transport on climate change’ (71% for 18-34 year olds compared to 75% for all) (Taylor, 2010). 18-34 year olds were more likely than other age groups to say they walk rather than drive more often and give/receive lifts more often in the last 2-3 years for the sake of the environment, but less likely to say they use public transport instead of the car more often.

3.6.3 Decline in cars as status symbols

After the Second World War, car use came to function as a symbol of independence and transition to adulthood, and this role can still be seen among young people (Barker, 2014; Delbosc and Currie, 2014b). However, the link between independence and car use is not inevitable and may depend on context. This is suggested by research finding that in London free bus travel creates a social space in which adolescents can enjoy independent travel with their peers (Goodman et al., 2014).

Various studies demonstrate the symbolic importance of cars and their role in creating personal identity. An Australian study considering driving cultures and road safety (Redshaw, 2006) showed how cars are feminised through colour (notably pink cars for women) and gendered through driving practices, with young women assumed to drive more carefully and young men using cars to demonstrate masculinity through the type of car as well as driving behaviours. A British qualitative study of young people (11-18) and crime revealed how cars can be central to gaining cultural capital for young working class males

through both legitimate collaborative activities such as the maintenance and repair of cars, and illegitimate activities such as theft and joy riding (France et al., 2013).

At the same time, it may be possible for the cultural significance of the car and driving to be displaced by other items/activities, although there is little academic research to confirm these claims (Delbosc and Currie, 2014b). Interviews with urban young people aged 18-27 in Edinburgh have shown that other activities and ways to spend money take preference over taking driving lessons and running a car, although future car ownership is not ruled out (Garner, 2015). Evidence from a large sample in the United States has found that Millennials have a weaker 'auto orientation' - a term meaning the 'propensity to value the freedom and independence gained from owning cars and to disagree with the concept that borrowing or sharing a car is just as good as owning one' - compared to other age groups (Coogan et al., 2016).

3.7 Transport and mobility

3.7.1 Improvements in public transport

There is very little academic literature on changes in the public transport that is available to young people in the UK. An analysis of changes in accessibility to jobs by public transport resulting from Edinburgh's tram network development (both the phases completed and future phases) showed that it is mainly improving access to jobs for parts of the city which already have better access, and therefore young people living in parts of the city with poor access will benefit little (Karou and Hull, 2014). Another study of changes in accessibility in London also demonstrated inequalities in who benefitted from public transport improvements (Ford et al., 2016).

Use of objective measures of accessibility is very insightful, but perceptions of accessibility can be very different (Curl et al., 2015). It is found that for most trip purposes, subjective journey times by public transport (as reported in the National Travel Survey) are longer than objective times (based on DfT's Core Accessibility Indicators) in urban areas, where young adults make up a disproportionate amount of the population. For rural areas, the opposite was found, with subjective journey times being shorter than objective times. This suggests that public transport is not perceived to provide fast journeys, at least in urban areas. There is no evidence on how such perceptions are changing over time.

3.7.2 Stricter driver licensing regime

Passing the driving test is a pivotal moment for a young person becoming a driver. Yet, young people are more likely to be involved in a collision than other drivers and young people's driving is often understood as a safety concern because of the risks involved to young drivers themselves, their passengers, other road users, and insurers. A range of changes has been implemented to the driving test and driver training over the past 30 years to mitigate those risks, including the introduction of restrictions on who can accompany a learner driver with a provisional licence (1990), a separate written theory test (1996) and the addition of a hazard perception element to the driving test (2002). It is no surprise, therefore, that a qualitative study commissioned by DfT (Watt et al., 2012) found that young people aged 15-24 felt that authorities make driving difficult for young drivers.

3.7.3 Increased car insurance costs

Young drivers usually pay much more for motor insurance than older motorists because they are much more likely to be involved in an accident and make a claim (ABI, 2015). A second reason is that insurers have limited their risk exposure because the non-comprehensive policies that were most popular among young and/or newly-qualified drivers have historically accounted for greater underwriting losses. Data on motor

insurance premiums suggests that over the longer term the price of motor insurance has increased faster than the costs of other goods and services (CMA, 2014), despite a reduction since 2012 as a result of government intervention (AA, undated). Young people aged 15-24 saw insurance as expensive, complicated, time consuming and not calculated fairly, and the insurance industry as greedy and corrupt (Watt et al., 2012).

3.7.4 Increased spending on transport

There is surprisingly limited literature on changes in young people's expenditure on transport and how these may have affected their travel behaviour. Information on changing transport expenditure can be obtained from the Living Costs and Food Survey (LCFS). Overall expenditure on transport in young households (where the household head is aged under 30) has developed in similar ways to the average household since 2000 (LCFS, 2016). For both young and average households, expenditure declined between 2001/2 and 2011 and increased slightly afterwards. The pattern of decreasing overall expenditure among young households applies to vehicle ownership and personal transport but not to transport services (bus, rail, taxi and other services). Young households spent more than the average household on transport services (11% more in 2008 and 40% more in 2014). Over time there has been a shift in expenditure from vehicle purchase to transport services for all households, but especially for young households.

3.7.5 Rise of shared mobility

The rise of shared mobility (transport services that are shared among users) is now one of the most widely debated changes in transport. This is particularly relevant to young people as they are seen as engaging most strongly in the sharing economy. There are many definitions of the sharing economy but enabling access to idle assets, such as vehicles, instead of ownership is a key element.

In 2015, UK car clubs had over 200,000 members with over 3,000 cars across more than 30 cities and towns (Steer Davies Gleaves, 2015). Car club membership has been shown to restrain car ownership and use (Chatterjee et al, 2013). London has the UK's primary market for car clubs with approximately four in five car club members residing in London. Users of car club services tend to be male, aged 25-45, living as a single person or a childless couple, well-educated, with a middle or middle/upper income, non- or one-car owners and live in an urban neighbourhood (Le Vine et al., 2014; Steer Davies Gleaves, 2015).

Scientifically robust research studies of lift sharing (e.g. Bla bla car) and ride hailing (e.g. Uber, Lyft) in the UK have not been identified. An on-street survey in three locations in San Francisco found that ride-sourcing users were generally younger and had higher levels of educational attainment than the average resident of San Francisco, but their income profile was similar and the majority had a vehicle at home (Rayle et al., 2016). Millennials in the 'California Millennials Dataset' were found to use on-demand ride services (Uber, Lyft) more than Generation X, although to a relatively small extent (Circella et al., 2016). While use of such services tended to replace car driving for Generation X, it tended to replace public transport and walking for Millennials.

In November 2016, twenty UK cities offered a public bike-sharing scheme (Carplus, 2016), of which London and Liverpool had the largest schemes. The typical profile of users is: white, male, employed and, compared to the average population, younger, more affluent, more educated and more likely to cycle independently of bike sharing (Ricci, 2015). As with car sharing, there is a lack of scientifically robust research focused on the UK.

3.8 Summary

Drawing upon the above review of societal trends we can make a preliminary assessment of their likely significance for young people's travel behaviour. This will be examined further in the next chapter by referring to specific studies that have looked at young people's travel behaviour.

Demographics - the increase in later marriage and parenthood, along with the rise in the number of single-person households, have unfolded gradually over a long period of time. They are likely to have dampened the perceived necessity to own and use a car but are likely to be only weakly linked to changes in travel behaviour since 1990, since they are trends that started prior to 1990. As young migrants have a strong tendency to live in more urban environments, it is plausible to expect that inward migration has contributed to lower levels of driver licensing, car access, car use and overall distance travelled.

Living situation - the trends of young people being more likely to postpone leaving the parental home, live in shared or rented accommodation, and live in an (highly) urbanised environment can be expected to have contributed to reduced driver licensing and car use and greater public transport use. Effects on car access can be expected to be slightly more ambiguous, as living in the parental home may also lead to more opportunities for using household cars.

Socio-economic situation - increased participation in higher education and the knock-on effect of later entry into the workforce would be expected to have reduced driver licensing and car ownership and use for young people, especially those in their early twenties. The effects of these trends would be expected to have been particularly striking in the 1990s when there was a rapid rise in HE participation (which appears to be the case from **Figures 5 and 6** on page 8). Increased labour force participation of women in their late twenties (up to 2005) would have been expected to act to increase their driver licensing, car ownership and car use, and there is evidence of this from **Figure 7** on page 8). The decline in young people's disposable income, the growth in low-end service jobs and the rise of low-waged, uncontracted work are also likely to be key contributors to the drop in driver licensing, car ownership, car use and overall mobility, with probably more ambiguous effects on public transport usage.

Information and Communication technologies (ICTs) - on the basis of the limited existing social science literature on young people's use of ICTs, it is reasonable to expect that the effects of such use on young people's travel behaviour have been modest so far. However, the relative absence of evidence is a real concern. There is some evidence of a shift in teenagers' co-presence from the physical to virtual world, but in most respects ICT use seems to be supplementing existing face-to-face social interaction rather than replacing it. There is little evidence that ICT use is making public transport use more desirable. In addition, there are strong differences and inequalities in ICT use, partly structured by gender, class and residential context, which suggests that not all young people are affected in the same way.

Values and attitudes - the evidence for changes in values and attitudes as causes of changes in young people's travel behaviour is ambiguous. This is partly because of differences in values and attitudes within the young population and also because the link between values, attitudes and behaviour is mediated by all kinds of processes, including the realities of young adults' demographic, living and socio-economic situations. Nevertheless, the rise of 'emerging adulthood' (a phase of life in which young people explore possibilities for their lives) may be reinforcing the effects on travel behaviour triggered by more structural changes in young people's demographic, living and socio-economic situation. Overall, we consider there to have been cohort effects with changes in values and attitudes contributing to reduced car use and increased public transport use, cycling and walking. However, the relative importance of changing values and attitudes in

shaping travel behaviour is likely to be stronger among middle-class youth with realistic prospects of eventually securing the traditional markers of adulthood.

Transport and mobility - it appears evident that changes in transport and mobility have exercised some effects on young people's travel behaviour. Changes in driver licensing regimes have possibly been the most influential of all the transport factors considered, given that they have occurred over a substantial period of time and may have affected the greatest number of young people, irrespective of income, residential location and attitudes. The impacts of many of the other changes have been uncertain, in part because of a lack of data and research - e.g. increased car insurance costs - and in other instances - e.g. rise of shared mobility - because the trends are too recent to allow for population-level impacts to be understood.

4. What Might Be the Causes of Change? Explanations Offered within Published Literature

This chapter reviews empirical evidence from published studies seeking to explain changes in young people's travel behaviour. Most of the literature reviewed has been published since the start of 2013 when a burgeoning interest developed around the topic but some earlier literature found to be relevant has been reviewed. Whilst the focus of this report is on evidence from the United Kingdom (UK), this review has extended its scope to include evidence from other settings which could reasonably be expected to apply to the UK. The types of studies that have been undertaken and their strengths and limitations are noted in Appendix A. Summaries are provided below of the contributions from published studies for each of the five different travel behaviour indicators introduced in Chapter 2.

4.1 Driving licences

There is good evidence from cross-sectional analyses of UK data to suggest that the fall in licence holding has been driven, at least in part, by changes to the lives of young people in terms of demographics, living situation and socio-economic situation (Le Vine and Polak, 2014; Berrington and Mikolai, 2014; Le Vine et al., 2014). These analyses have shown that licence holding is less likely for young people born outside the UK, not living with a partner, renting and not employed full time, and these characteristics are known to have become more prevalent (see Chapter 3).

However, when looking at trends among those young people for whom a reduction in licence holding would have been less expected, such as the full-time employed, it has been found that the fall in licence holding has only been slightly smaller than the fall seen in the rest of the population (Noble, 2005). This is an indication that there are other factors behind the changes in travel behaviour than the demographic, location and socio-economic factors mentioned above.

Cohort analyses undertaken in other countries with repeated cross-sectional data have found that not all observed reductions in driving licence holding can be explained by changes in demographics, living situation and socio-economics of young people (Delbosc and Currie, 2014a; Hjorthol, 2016; Thigpen and Handy, 2015). Driving licence rates are lower than would have been expected from changes to these alone. This again implies that other factors are important. For example, toughening of the driver licensing regime, higher costs of motoring for young people and a cultural shift away from the car have been suggested as possible explanations (Delbosc and Currie, 2014a).

In the National Travel Survey, when asked why they are not learning to drive, young people most frequently cite costs (costs of learning to drive, buy a car and insure a car) and second most frequently cite not needing to drive. It has been found that those with a lower income were likely to only cite costs, while those with a higher income were likely to cite cost and lack of necessity (Le Vine and Polak, 2014). Interviews with young people in England have confirmed the importance of the costs of motoring (especially insurance costs) for not starting to drive but also revealed not starting families, living in urban areas and lack of parking as reasons for not driving (SRA, 2015). Interviews have also revealed mixed attitudes towards driving with views on cars ranging along a spectrum from those enthusiastic, those neutral, to those sceptical (Taylor et al., 2007). A key question is whether scepticism towards cars will persist as young people get older.

The findings above suggest that changes to the lives of young people in terms of demographics, living situation and socio-economic situation have contributed to lower licensing but they do not fully explain the fall in the number of young people acquiring a driving licence. The cost of motoring is cited by young people as the most important

reason for not learning to drive, particularly by those with lower incomes. Driving being non-essential and difficult in urban areas is also cited.

4.2 Car access

Given established relationships between car ownership and personal characteristics, recent trends such as lower full-time employment and greater living in cities would have been expected to restrain young people's car ownership. An analysis of the US Panel Study of Income Dynamics (PSID) data for 1999-2013 has shown that, at an equivalent age, Millennials lived in households with fewer cars per adult than people who were born in the 1970s (Klein and Smart, 2017). Economic circumstances explained the lower level of car access for Millennials living independently of other adults but for Millennials living dependently (e.g. with parents or other older adults) there was an unexplained cohort effect. This indicated a lower tendency to own or have access to a car among Millennials living with their parents or other older adults than had been the case for earlier cohorts.

In the British context, car access has decreased to a much greater extent both for young people in London and those with a higher income, which suggests that a car has become less necessary or desirable in these contexts (Le Vine et al., 2013). This is borne out by attitudinal research finding that cars are not seen as aspirational by financially better off, non-car owning young people (Thornton et al., 2011). It is estimated that only one third of the observed reduction in car access between 1998 and 2008 for young households is explained by changes in household composition (in terms of demographics, living situation and socio-economic situation), suggesting an unexplained cohort effect has occurred in Great Britain (Le Vine et al., 2013).

Analysis of panel data from the UK Household Longitudinal Study (Understanding Society) has revealed the circumstances in which households are more likely to change car ownership (Clark et al., 2016a). It is clear that events associated with a transition to adulthood (acquiring driving licence, entering employment, partnership formation, having a child) increase the likelihood of becoming a car-owning household. If these events are postponed or foregone (see Chapter 3) then reduced car ownership is to be expected. Additionally, the panel data shows that volatility of young people's lives in terms of living and socio-economic circumstances leads to instability in car ownership and this is likely to have increased in recent years given more unstable employment (Clark et al., 2016a).

Interviews with Baby Boomers and their children (referred to as Echo Boomers) have been used to understand differences in car ownership between young men and women from the two birth cohorts (Jones, 2013). Echo Boomer women said that they had learnt to drive as soon as they could (unlike their mothers), while Echo Boomer men were split between those getting cars as soon as they could, those getting a car later in adulthood and those who had not got one. According to Jones, the greater tendency of Echo Boomer women to acquire a car reflects differences in their future career and family expectations. For example, Echo Boomer women were more likely to concentrate on their career before having children. For men there was a clear difference in the symbolic value of cars between the birth cohorts. While for Baby Boomer men car use offered independent travel and status, car use seemed to have less symbolic value for their sons. Other consumption items had taken over that role and modes of transport other than the private car were seen as more efficient for travel within cities because of congestion and parking pressures.

4.3 Total travel

Not much research was found acknowledging, let alone explaining, the large reduction in total travel by young people. One British study found a tendency for Millennial men to travel less for non-work travel than earlier cohorts which is not fully explained by changes in their living and socio-economic situation (Tilley and Houston, 2016). Reasons offered for this finding were men socialising more at home due to having less disposable income,

familiarity with online communication and higher relative alcohol prices for licenced premises. US research has found that the reduction in person kilometres travelled between 2001 and 2009 by young adults is explained well by changes in economic circumstances (employment status in particular) and suggest ‘the future of travel—for youth as well as adults—largely hinges on the state of the economy’ (Blumenberg et al., 2016).

Analysis of American Time Use Survey (ATUS) data for 2003-13 has found that Millennials are travelling less and spending more time at home than earlier cohorts (Garikapati et al., 2016). The authors downplay the difference, suggesting it could disappear as Millennials get older. There has been research investigating whether young people who use ICTs more tend to travel less. The findings from such studies suggest the opposite. Young people in the Netherlands aged 30 or under who use ICTs more have been found to be likely to engage more in out-of-home social activity (Kroesen and Handy, 2015). The conclusion was made that the digitisation of society is not a contributor to the reduced car use of young adults, but we would argue that to fully understand the effect of digitisation over time requires an examination of the trends of both ICT use and travel over time (as the authors acknowledge).

4.4 Transport mode use

A study analysing UK household panel data has identified contextual circumstances and life events associated with increasing car use, many of which have become less prevalent since 1990 (entering employment, having a child, acquiring a driving licence) (Clark et al., 2016b).

A variety of valuable insights has been obtained from research in the US. This includes the increased prevalence of a ‘car-less’ group of young people who tend not to be in employment, have limited travel in general and are interpreted as being in hardship (Ralph, 2016). It can be expected that such a group also exists in the UK. US Millennials have been found to have different values than previous generations, displaying lower interest in cars, greater interest in ICTs and greater concern for privacy when travelling (Coogan et al., 2016). The propensity to take rail for long-distance journeys was greater in Millennials with less interest in cars and more interest in ICTs, and smaller in Millennials with greater concern for privacy for travel. This suggests Millennials’ relative interest in ICTs and disinterest in cars leads them to use rail over other modes. However, their concerns for their own privacy discourage use of rail.

Two other studies from the US appear to be contradictory. One nationwide study found that increased transit use over time of young people can be largely explained with demographic, locational and socio-economic factors (Brown et al., 2016). The authors of the study caution that it cannot be assumed that higher use of transit will persist as young people age since their life circumstances may become similar to those of previous generations. In comparison, a San Francisco study found that reduced car use between 2002 and 2012 was not a consequence of changes in socio-economic factors or transport conditions, but of a change in transport mode preferences (Vij et al., 2017). It is unclear whether this different finding for San Francisco reflects specific local circumstances or whether it is a consequence of the different type of data and analysis used. To check whether explanatory factors are common to two populations would require the same type of data and analysis to be performed for each.

4.5 Car driving distance

Studies seeking to explain aggregate reductions in car mileage across all age groups have found that changing incomes and fuel prices provide a plausible explanation but that these cannot explain the particularly large reductions seen for young adults (Bastian et al., 2016, for six countries including UK; King et al., 2016, for US).

Many of the same factors affecting the likelihood of having a full driving licence, and a car, also influence the distance driven by car by people with a licence, according to cross-sectional analysis of UK data. This is notably true of location type, employment status and individual income (Berrington and Mikolai, 2014). Given the changes seen in these factors (see Chapter 3) it is not surprising that in recent years young people have driven less, as seen in the trend reported in Chapter 2.

Over time, more young people have had occupations or living arrangements that typically lead to people driving less, such as being a student or living in the parental home. However, young people who typically have high car mileage, such as men in full-time work, are also driving less (Le Vine and Jones, 2012). This suggests that there is a cohort-wide change that is not due solely to demographic, location or socio-economic factors.

Research from the US using National Household Travel Survey (NHTS) data has found that between 1995 and 2009 there was a drop in the number of miles driven by adults aged 19-30 years, and that 10-25% of this was due to lifestyle changes, 35-50% was due to changes in behaviour specific to Millennials and younger members of Generation X and 40% was due to a general fall in the number of miles driven by all age groups (McDonald, 2015). It is not possible to conclude further from this study, or any other single study that we have reviewed, on the nature of the ‘Millennial-specific factors’ and whether these involve changes to values or social practices, or to unmeasured demographic, location or socio-economic factors.

An analysis of 2002-10 NTS data found that people who acquired a driving licence later in life drove fewer miles per year than people of similar age who acquired a licence earlier in life (Stokes, 2013). This analysis has been updated with 2014 data and it shows the same result (see Figure 22 below). This is important evidence, meaning that fewer people gaining a driving licence in early adulthood not only results in less driving at that life stage but in later years (a persistent cohort effect).

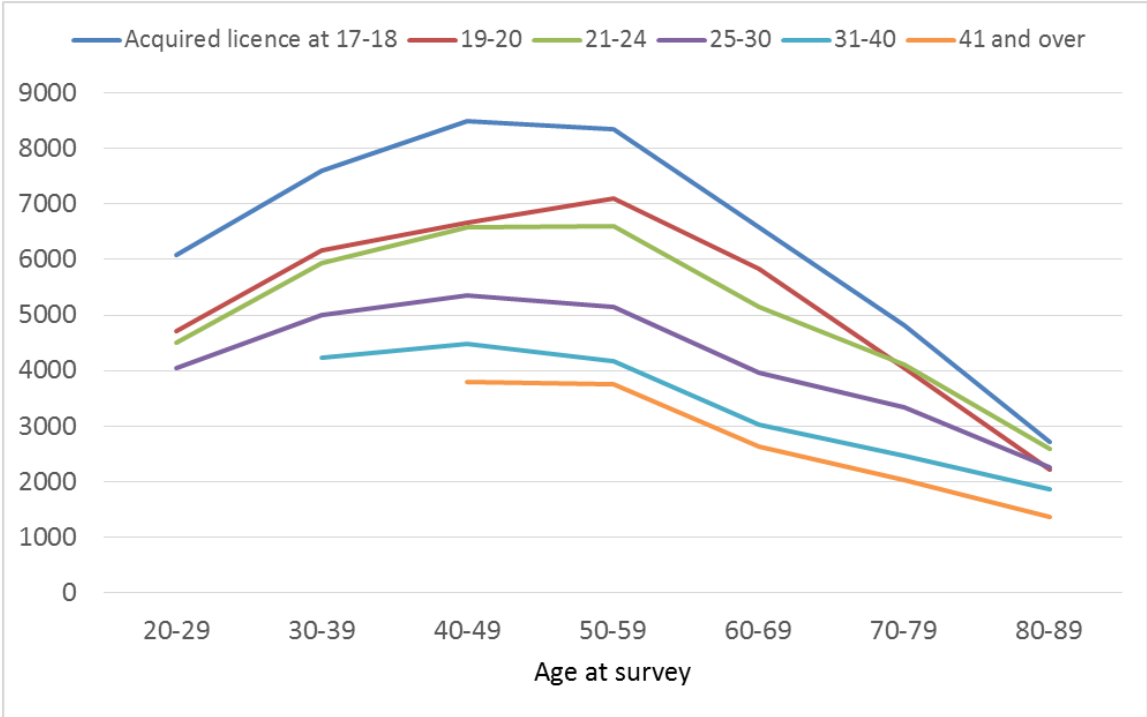


Figure 22: Average Car Driver Miles per Person per Year by Age Group and Age when Started Driving for Full Licence Holders in England 2002 to 2014 (source: study’s analysis of NTS data)

4.6 Summary

The studies reviewed here have shown that differences in life circumstances (with respect to demographics, living situation and socio-economic situation) explain some of the observed differences in travel behaviour between Millennials and previous cohorts of young people in Great Britain and in other countries. However, they do not explain all of the observed differences - there are *unexplained cohort effects*.

These unexplained cohort effects could be attributable to differences in life circumstances which have not been captured in the studies (for example, working in a low-wage, uncontracted job). Alternatively, they could be attributable to changes in the values and attitudes of young people and in the transport and access options available to them. Surveys and interviews have shown that many young people accept not driving. It is unclear if this reflects a generational change in attitudes towards driving (which may or may not persist as Millennials age) or a pragmatic recognition by individuals, their peers and wider society that driving is not essential at this stage in life or in the place they live.

Changes to the cost of driving in the last twenty years have been found to affect the travel behaviour of all age groups (acting as period effects) but they may have had a particularly large effect on young people and contributed to the unexplained cohort effects referred to above. There has been very little research investigating the effect of transport costs or other barriers to mobility on young people. In interviews, the high cost of driving has often been mentioned as something discouraging young people from learning to drive. There is no research that has adequately assessed the effects on travel behaviour of increased use of ICTs in everyday life. However, there are no alternative explanations that adequately account for the drop in the number of trips made by young people.

The most rigorous findings have been obtained from analyses of large multi-year travel surveys which have allowed cohorts to be compared. One study has used British National Travel Survey (NTS) data (Tilley and Houston, 2016) and there is scope for further useful analysis of NTS data. Useful insights have also been obtained from one-off surveys and interviews with Millennials but these have not specifically been designed to probe differences between Millennials and other cohorts. Suggestions for future research are provided in Chapter 6. Before that, in Chapter 5, we report on three short pieces of secondary data analysis that were carried out to supplement the evidence obtained from the literature review.

5. What Might Be the Causes of Change? New Analyses of Existing Data

The analyses presented in this chapter were designed in response to the evidence gaps highlighted by this report's review of published studies. All analyses refer to data from England only.

5.1 Changes in time spent at home and at journey destinations

The aim of this analysis was to assess whether there was a trend for time spent travelling to be substituted by time spent at home or time spent at out-of-home locations (such as the workplace).

National Travel Survey (NTS) statistics show that the number of trips undertaken has decreased substantially over time, especially for young people (see Section 2.3). Results from the American Time Use Survey for 2003-2013 indicated that Millennials are spending more time at home than earlier cohorts (Garikapati et al., 2016).

In this analysis, NTS travel diary data was used to estimate time spent at home and at different journey destinations from 1995 to 2014. The methodology can be considered relatively reliable for measuring time spent at home and time spent in travel and reasonably indicative for time spent at work (notwithstanding that working at home and other locations than workplace are not picked up). For other purposes, it can only be taken as broadly indicative of time spent in activities, since activities are not always defined by the purpose of the preceding journey.

The analysis found that between 1995 and 2014 people in England were on average recording about 20 minutes more time spent at home every day. Increases in time spent at home were particularly large for men aged 17-29 (increase of 80 minutes per day) and for women aged 17-29 (increase of 40 minutes per day), as shown in **Figure 23**. The difference in time spent at home between men and women in this age group was negligible by 2007.

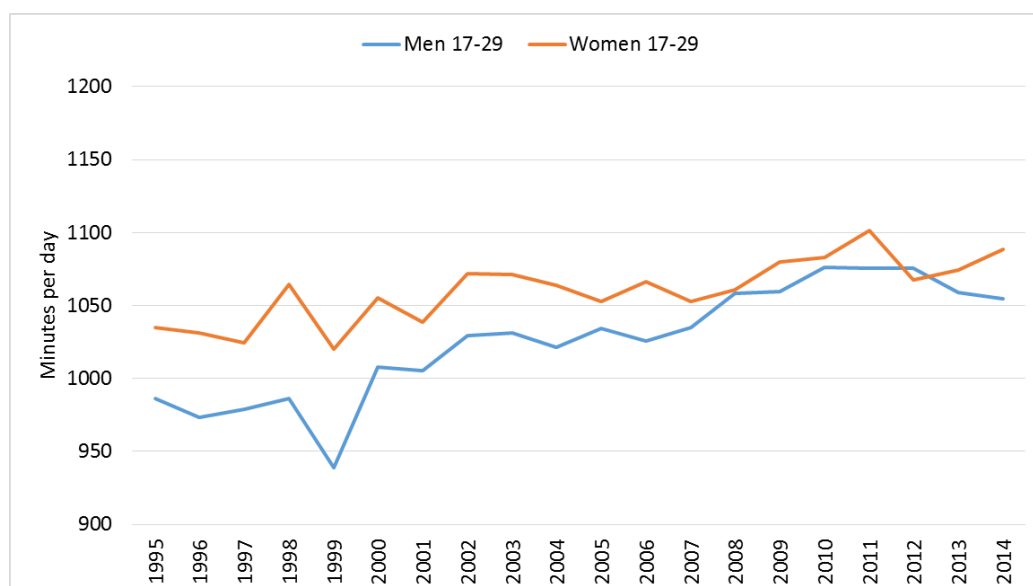


Figure 23: Time Spent at Home by Men and Women aged 17-29 in England 1995 to 2014
(source: study's analysis of NTS data)

In addition to spending more time at home, young men and women have also spent less time at work locations (decrease of 50 minutes for men and 30 minutes for women per day). There has been a decrease in the time spent at social destinations, compensated by

an increase in time spent at leisure destinations⁸. There has also been a 10 minute per day reduction in time spent travelling (consistent with the reductions in trips and distance travelled highlighted in Chapter 2).

Examination of five year birth cohorts showed that, for men in particular, the trend over the last 20 years for spending more time at home has occurred within cohorts as they age, as well as each successive cohort spending more time at home than the previous cohort (see **Figures 24 and 25** below⁹). This indicates that the changes in time at home reflect both period and cohort effects.

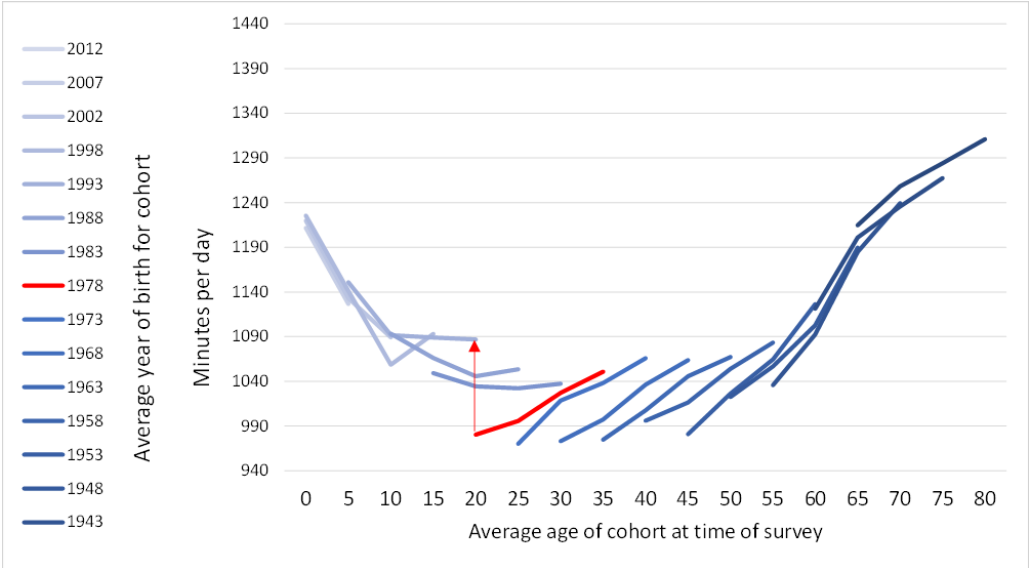


Figure 24: Time Spent at Home Progression with Age for Birth Cohorts of Men in England 1995 to 2014 (source: study’s analysis of NTS data)

⁸ Social journey purposes in NTS are visit friends/relatives at home, eat or drink with others and other social activities. Leisure journey purposes are entertainment/public social activities, sport participation, travel from/to a holiday base, day trip and going for a walk.

⁹ In each graph, the red line shows the average number of minutes spent at home for the cohort of people born around 1978 in successive time periods as they age. Thus, when males born around 1978 were about 20 (1995-99) they spent about 970 minutes at home, but in 2010-14 (when they were about 35) they spent about 1050 minutes at home per day (80 minutes more). The vertical red arrow shows the difference in time spent at home for people aged around 20 and how this has changed between 1995-99 and 2010-14. For example, men aged about 20 in 1995-99 spent about 940 minutes at home, and men aged about 20 in 2010-14 spent about 1090 minutes at home (two and a half hours more).

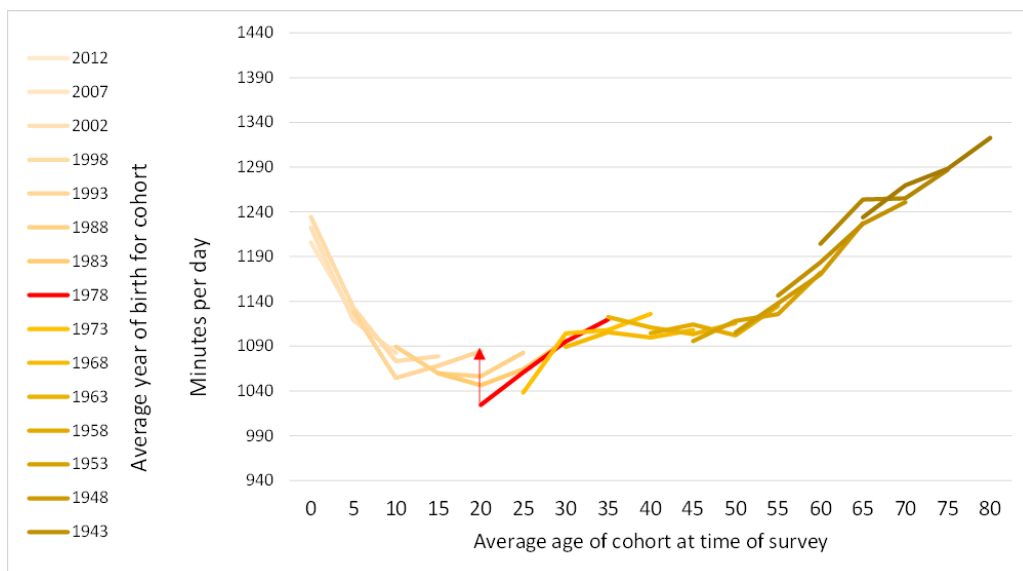


Figure 25: Time Spent at Home Progression with Age for Birth Cohorts of Women in England 1995 to 2014 (source: study's analysis of NTS data)

The trends described above apply across employment status and living situation sub-groups. As an example, full-time workers increased the time they spent at home and reduced the time spent at work locations nearly as much as the average trend for the age group. The smaller increase in time spent at home for women is partly due to fewer young women having children.

In interpreting the results above, we note that the decreasing trend for time spent at work locations preceded the global financial crisis of 2007/8. This suggests a longer-term change in the nature of employment. Increased working at home (for employed and self-employed people) could explain the increase in time spent at home by full-time workers. Census data for 2001 and 2011 noted an increase in both working at home and being self-employed (Amankwah and Wales, 2016), although these trends are generally more prevalent among older age groups. Working hours available to younger people have also diminished (Bell and Blanchflower, 2013), which offers another possible explanation.

The connection between the results from the analysis reported here to the reduction in travel by younger people examined in the rest of the evidence review is not fully clear. The ability to undertake more activities at home may have caused more time to be spent at home and less need and desire for travel. Alternatively, barriers to travel, such as rising costs, could have led people to adapt how they undertake activities and to do more of them at home, meaning that the change in time spent at home is not a cause of reduced travel but a consequence of changes in travel conditions and life situations.

5.2 Changing spatial distribution of young adults

The aim of this analysis was to assess the extent of change in where young people live and their commuting behaviour.

In the literature review, we found evidence that increased urbanisation is likely to be an important factor leading young people to drive less, given that an increasing proportion of young adults are living in London and other Metropolitan areas (see Section 3.3.3). The evidence is incomplete, however. While there is evidence that young adults have been moving towards larger settlements, there has been no comprehensive investigation of their spatial distribution within settlements and no attempt to relate this to their travel

behaviour. Through analysis of the Census of England and Wales for 2001 and 2011 we were able to investigate this.

Over the decade, the population density of England's urban areas increased. The average densities of areas known as Lower Layer Super Output Areas (LSOAs)¹⁰ increased by 10% between 2001 and 2011. The 16-24 age group largely followed the national trend but the 25-34 age group became more concentrated in denser areas over that decade; and the average density of the LSOAs in which they live increased by 19%¹¹.

The proportion of workers aged 25-34 commuting by car decreased by 6.2 percentage points (%pts) from 56.1% to 49.9% between 2001 and 2011 (see **Figure 26** below) and the proportion commuting by public transport increased by 9.4%pts from 13.7% to 23.1% (see **Figure 27** below). These changes were larger for those living in more densely populated areas (9.4%pts decrease in commuting by car and 14.0%pts increase in commuting by public transport in densest quartile of LSOAs). The changes were also much larger for those living in London. When removing those living in London from the analysis there were still reductions in car commuting (3.5%pts) and increases in public transport commuting (4.5%pts) among 25-34 year olds and the changes were larger with increased population density. This provides confidence that living in a higher density area and living in London are separately associated with the commuting mode choices of this age group. When considering commuters of all ages, changes in the proportion of people commuting by car and by public transport almost exclusively occurred for those living in London.

The proportion of workers aged 16-24 commuting by car increased by 3.9%pts from 34.9% to 38.8% between 2001 and 2011 (see **Figure 26** below). This applied across area types, except for those living in the most densely-populated areas and in London. The proportion of workers aged 16-24 commuting by public transport increased by 1.8%pts from 21.1% to 22.9% (see **Figure 27** below). There was an increase in public transport commuting in the most densely-populated areas and in London but no change for 16-24 year olds in low and medium density areas and outside the capital. This implies that outside the most urbanised areas the increase in driving to work was at the expense of other modes of transport, such as walking. It is also notable that the proportion of 16-24 year olds in work fell from 58% to 52% over the decade and the commute distances of those in this age group increased by more than the general trend for all ages. This indicates that changes in the labour market may have contributed to increased car commuting for this age group, such as jobs tending to become more distant from where they lived and less accessible on foot. Over this period, there was a general trend for 16-24 years olds to drive less (as indicated by **Figure 11** on page 10).

¹⁰ LSOAs (Lower Layer Super Output Areas) are geographical units of analysis with an average of 1,500 residents and 650 households.

¹¹ The two age groups analysed, 16-24 year olds and 25-34 year olds, correspond to the categories used in the Census tables available for the analysis.

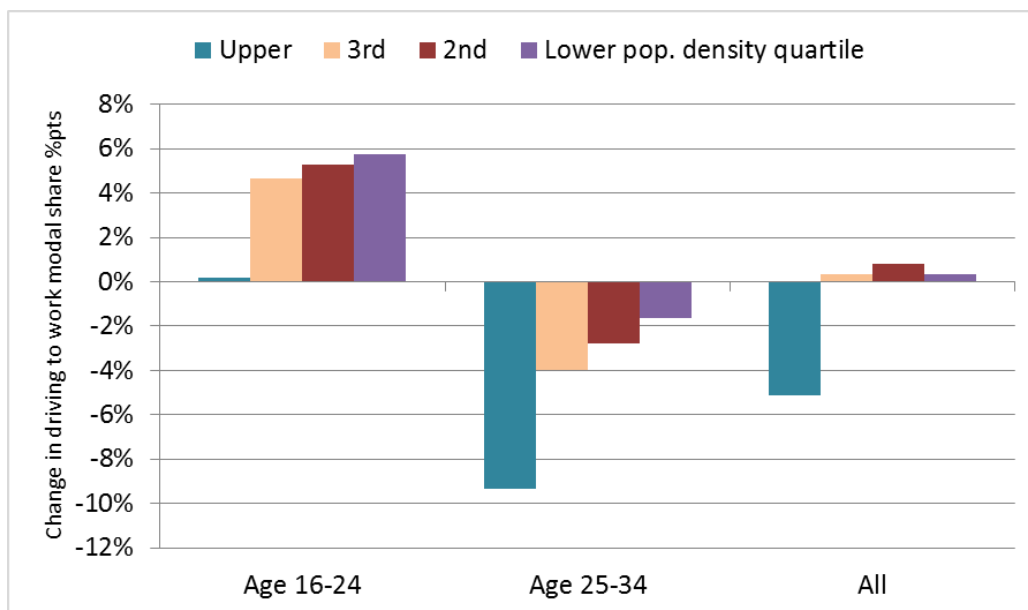


Figure 26: Change in Driving to Work Modal Share by Age and Population Density of Home LSOA in England 2001 to 2011 (source: Census 2001 and 2011)

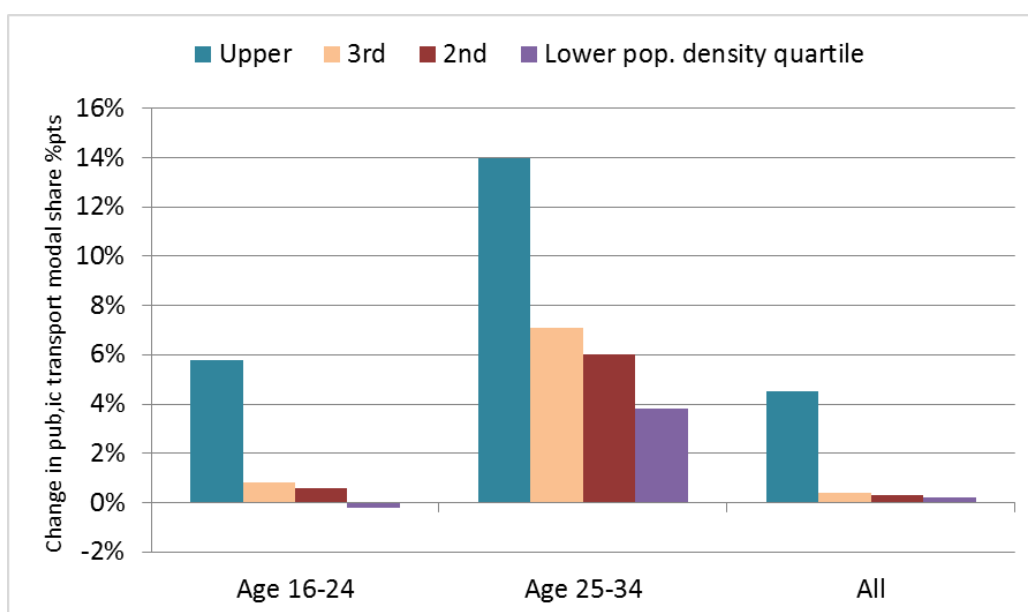


Figure 27: Change in Public Transport Modal Share by Age and Population Density of Home LSOA in England 2001 to 2011 (source: Census 2001 and 2011)

Multiple regression analysis was carried out to further explore relationships between the proportion of the LSOAs commuting by car/public transport and population density, settlement type, census year and interactions between these variables. This confirmed that driving to work was less likely for young workers (both 16-24 and 25-34 year olds) living in areas with higher population densities and living in London or other large cities (with at least 250,000 residents). It also showed that the likelihood of driving to work for young workers decreased in 2011 in more densely populated areas and in London (potentially due to the availability of improved alternatives to driving to work). Similarly, the analysis showed that using public transport was more likely for young workers living in areas with higher population densities and living in London or other large cities. The likelihood of using public transport increased in 2011 in London, particularly for those aged 16-24 years old.

The regression analysis showed that the relationships between population density/settlement type and commuting by car/public transport (and the changes in these relationships between 2001 and 2011) explained well the decrease in the proportion of workers aged 25-34 driving to work between 2001 and 2011, but not the increase in the proportion using public transport. This implies that the trend of more young adults living in highly urbanised areas (and driving to work becoming less likely in highly urbanised areas) reduced driving to work for this age group, while other factors were responsible for increased public transport use (such as a greater willingness to use public transport or jobs increasingly accessible by public transport). In contrast, population density/settlement type did not explain the change in the proportion of workers aged 16-24 driving to work, but did explain the change in public transport use. This implies that the increase in driving to work for this age group was not related to where they lived but to other factors (such as a decreased willingness to use alternatives to driving and jobs increasingly inaccessible to other forms of transport than driving), while the increase in public transport use related to where they lived (most likely a London effect as discussed in the previous paragraph). The differences in the commuting trends between the two age groups, and the potential explanations for these trends, show the need to avoid making generalisations across the young population.

The analysis reported was based on aggregate national data and included only spatial variables; in itself it did not explore *why* changes occurred. The analysis shows that young adults had a greater tendency to live in larger settlements and denser neighbourhoods in 2011 compared to 2001 and this was truer for 25-34 year olds than 16-24 year olds and the rest of the working population. The reason for this change in residential situation cannot be explored with this analysis.

At the same time, the relationship between travel behaviour and both population density and living in London strengthened amongst 16-24 and 25-34 year olds with a reduction in driving to work seen for those living in the most populated areas and across London. The difference between the commuting mode choices of young adults in London, and in densely populated areas of other large cities, and their peers living elsewhere has widened. Possible reasons for this include: (i) improved public transport in large cities; (ii) employment in large cities being increasingly located in areas better served by public transport and more constrained for car commuting; (iii) housing costs and design in large cities making it unaffordable and inconvenient for young people to own and use a car; and (iv) young people who prefer and can afford an urban lifestyle increasingly concentrating in large cities. Further research is required to examine these hypotheses.

5.3 Life trajectories and travel behaviour

The aim of this analysis was to understand how life trajectories in early adulthood influence travel behaviour outcomes, to increase our knowledge of why a large proportion of the young adult population does not drive.

Most of the empirical studies reported in Chapter 4 used cross-sectional data (or repeated cross-sectional data) to identify factors associated with lower car use, which only gives a 'snapshot' of different people rather than following the same people over time. This analysis examined what paths or trajectories have been taken in the lives of individual young people (for example, in terms of their employment careers) to investigate how these have influenced their travel behaviour.

The research reported in this section used five waves of data from Understanding Society, the UK Household Longitudinal Study (UKHLS), for the four year period 2009/10 to 2013/4 to understand how life trajectories in early adulthood influence travel behaviour outcomes. The samples used in the analyses were restricted to young adult respondents

aged between 17 and 30 who were resident in England and who were members of the UKHLS general population and ethnic minority boost samples¹².

5.3.1 Driving licence acquisition

The first part of the analysis explored the factors which influence the decision to get a driving licence. A two-step process was followed where a *baseline* multiple regression model was estimated first for the probability of 17-30 year olds holding a driving licence in 2009/10 (N=9915); then, a *transition* multiple logistic regression model was estimated for the probability of non-licence holders (N=3374) acquiring a licence by the following year.

The *baseline* model has results largely consistent with previous studies (Le Vine and Polak, 2014; Berrington and Mikolai, 2014) but with some new insights made possible from the inclusion of additional variables. Licence holding was much more likely for those employed, with higher personal income and with economic capital/potential (as indicated by having post-16 educational qualifications, being a student, having higher household income or having a father working when aged 14). Licence holding was less likely for those part-time or temporarily employed compared to full-time employed, indicating that low-wage, uncontracted work reduces the take-up of driving.

The main finding from the *transition* model (summarised in **Table 6** below) was that employment status was the most important determinant of acquiring a licence. A young person in full-time employment was 3.02 times more likely to get a licence in the following year than a young person not in education or employment. A young person who moves from not being in education or employment (a status also known as NEET) to employment was 1.82 times more likely to get a licence. Those without a licence who live with their children were 1.79 times more likely to get a licence, indicating that having a child is associated with a need or wish to drive. An increased likelihood of acquiring a licence was also found when there were more cars in the household, which indicates that the availability of a car to drive prompts young adults to get a licence.

¹² The results reported are based on analyses undertaken without using weights, as weights were only available to produce results for the UK general population and these were not strictly appropriate for analyses of young adults living in England. Most of the analyses were aimed at estimating causal effects (i.e. through regression analysis) where the necessity of using weights is debatable (Solon et al., 2015). It is important to use weights when estimating population descriptive statistics as was the case when estimating prevalence of life trajectories and car use trajectories. In this case, sensitivity analyses were performed, obtaining results with and without the available weights and the results were not found to differ substantially.

Table 6: Predictors of Driving Licence Acquisition

State/change variables	Change in probability of acquiring a licence (state variables)	Change in probability of acquiring a licence (change variables)
<i>Demographic situation</i>		
Aged 18 (ref: aged 30)	1.99*	
Women (ref: men)	0.79*	
Long-standing health condition (ref: none)	0.70*	
<i>Living situation</i>		
Live with own child (ref: no child)	1.79**	
Rent public sector (ref: all other)	0.75*	
Large Urban (ref: medium urban) [†]	0.61*	
IMD score [‡]	0.99*	
Change from owning to renting		0.25**
<i>Socio-economic situation</i>		
Student (ref: not student/employed)	1.64*	
Employed (ref: not student/employed)	3.02**	
Part-time employed (ref: employed)	0.62*	
Father in work when aged 14	1.35*	
Change from employed to not employed		0.47*
Change from not employed to employed		1.82*
Change from student to employed		1.47*
<i>Transport and mobility</i>		
One household car (ref: no car)	1.34*	
Two household cars (ref: no car)	1.97**	
Three household cars (ref: no car)	3.49**	
Number of cases		3370
R ² (indicator of model fit)		0.087

† Live in urban non-metropolitan LSOA with more than 250,000 residents compared to urban non-metropolitan LSOA with 25,000-250,000 residents.

‡ Index of Multiple Deprivation score of LSOA based on Indices of Multiple Deprivation 2010 where a higher score indicates that the area contains a greater proportion of people being classed as deprived. Mean score = 30.

Statistical significance at 99% level indicated by ** and at 95% level by *.

Other variables that were included in the model (and controlled for but not statistically significant) were: ethnicity; other residential settlement types (than Large Urban); highest educational qualification; stopped living with a partner; change from renting to owning; change from employed to student; change from not employed to student; change from student to not employed.

Other variables that were not included in the model (not found to be statistically significant) were: born outside UK; live with parent(s); live independently (on own or with other non-related adults); live with partner; population density; in temporary employment; work at multiple locations; gross personal income; net household equivalised income; pro-environmental behaviour should fit with lifestyle; moved home; left the parental home; returned to parental home; started living with a partner; had a child.

5.3.2 Life trajectories and car use

The second part of the analysis considered changing life circumstances and travel behaviour over a four year period for 1,671 young adults aged 17-24 in 2009/10. Life trajectories were created for three domains of interest: living arrangements; employment status; and residential settlement type. In this analysis, the 'trajectory' refers to someone's pathway through these domains as they get older - for example, someone's employment trajectory may include spells of employment, unemployment and time outside of the labour force, such as time spent studying.

For living arrangements, the general tendency over the five-wave period was a move out of the parental home, but the extent of this transition was not very large. At the beginning of the five-wave period, 66% of the people in the sample were living with their parents, 18% were living with a partner and 16% were living on their own or sharing with other adults (other than parents or partner). Nearly half (48%) of the total sample lived with their parents at all waves. People who had returned to living with their parents were relatively uncommon with this data set, occurring for only 6% of the total sample during the five-wave period.

At the beginning of the five-wave period (2009/10), 41% of the sample were in employment, 38% were students and 21% were neither employed nor students. Most young people who were students at some stage in the five-wave period had transitioned to employment by the final wave (72%). Most young people who were employed at the start of the five-wave period were also employed at the final wave (67%). Just over half of young people who were neither employed nor a student (and without any occasion of being a student) had moved into employment (55%) by the final wave. Instability of employment status was common with 15% of the sample experiencing a wave-to-wave transition from employed to neither employed nor student and 23% experiencing the opposite transition.

Residential settlement trajectories were the most stable of the three types of trajectory. The extent to which people stayed in the same type of area was shown to increase with level of urbanisation, so, for example, 93% of London and Metropolitan dwellers stayed in this position for five waves compared to 85% of urban dwellers and 77% of rural dwellers.

Car use trajectories were created for each member of the sample based on their driving licence and car access status at each survey wave. Overall, a third of the sample (33%) was stable in not having a licence in any of the five waves, nearly a third (29%) was stable in having a licence and use of a car at all five waves and 1% was stable in having a licence and no use of a car at all five waves. The remaining respondents experienced change through the study period: 4% gained a licence, but not use of a car; 15% gained a licence and use of a car; 2% had a licence and gained use of a car; 9% lost a licence or use of a car; and 6% lost use of a car, but later gained use of a car again.

To test the usefulness of the life trajectory approach, multiple logistic regression analysis was used to assess if car driver status¹³ at the end of the five-wave period was better explained with the trajectory variables (employment trajectory type, living arrangements trajectory type and residential settlement trajectory type) than the fixed state variables (employment status, living arrangements and residential settlement type at wave 5). There was an improvement in overall model fit for the model with life trajectory variables compared to the model with life circumstances (state) variables and the model with life trajectory variables provided additional explanation on factors influencing whether a young adult is likely to be a car driver. Comparison of the two models is summarised in **Table 7** on page 42.

¹³ Members of the sample were defined as a car driver if they had a driving licence and use of a car or van.

Table 7: Predictors of Being a Car Driver When Aged 21-28

State/trajectory variables	Model 1 with state variables	Model 2 with trajectory variables
<i>Living arrangements state variables (ref: live with parents)</i>		
Live on own or sharing with other adults	0.74	
Live with partner	1.77**	
<i>Living arrangements trajectory variables (ref: parents to parents)</i>		
Parents to partner		1.62 [^]
Parents to on own		1.05
On own to on own		0.44**
On own to parents		0.64
On own to partner		1.58
Partner to partner		1.61 [^]
Partner to parents		1.14
Partner to on own		0.78
<i>Employment status state variables (ref: student)</i>		
In work	1.79**	
Not in work or student	0.47**	
<i>Employment status trajectory variables (ref: student to student)</i>		
Student to work		1.70 [^]
Student to other		0.45*
Work to work		2.97**
Work to student		1.54
Work to other		0.85
Other to other		0.25**
Other to work		1.60
Other to student		0.54
<i>Residential settlement type state variables (ref: London/Metropolitan area)</i>		
Urban (areas with 25-250k residents)	1.70**	
Rural	1.63*	
<i>Residential settlement type trajectory variables (ref: London/Met to London/Met)</i>		
London/Met to Urban		2.41
London/Met to Rural		0.59
Urban to Urban		1.54**
Urban to London/Met		0.78
Urban to Rural		2.08 [^]
Rural to Rural		1.57*
Rural to London/Met		0.96
Rural to Urban		1.55
Number of cases	1653	1653
R ² (indicator of model fit)	0.229	0.250

Statistical significance at 99% level indicated by **, at 95% level by * and 90% level by [^].

Other state variables that were included in the two models and statistically significant were: age; live with own child; housing tenure; population density; highest educational qualification; work at multiple locations; gross personal income; net household equivalised income.

Other state variables that were included in the two models but not statistically significant were: gender; born outside UK; long-standing health condition; in temporary employment; in part-time employment; father in work when aged 14.

With the living arrangements trajectories, those living on their own, or sharing with other adults, throughout the study period (8% of the sample) had 0.44 times the likelihood of being a car driver relative to people living with their parents throughout the study period. Someone moving from living with their parents to living on their own or sharing with other adults - or vice versa - had no change in likelihood of being a car driver. This suggests that young people living with their parents is not a major factor causing delays in getting a licence or driving. Moving to live with a partner or living with a partner throughout the study period increased the likelihood of being a car driver by 1.6 times, which indicates that moving to live with a partner is the change in living arrangements that has the greatest influence on car driving.

Turning to examine people's employment trajectories, we see that compared to being a student throughout the study period, people who worked throughout the period were 2.97 times more likely to be a car driver, people who went from being a student to being employed were 1.70 times more likely, and people moving from being unemployed or a student to being employed were 1.6 times more likely. This shows that continued, stable employment is associated with a greater likelihood of being a car driver than having moved into employment in the past four years. The model with state variables shows that, compared to being a student, the increase in likelihood of being a car driver at wave 5 is 1.79 times for an individual who is employed, an underestimate for those that have been in continued employment. Compared to being a student throughout the study period, being unemployed or a student throughout the study period is associated with a lower likelihood (0.25 times) of being a car driver. This represents a much lower likelihood than any other employment trajectory type and indicates the cumulative effect of not working. In summary, not only current employment status but past employment status was found to influence whether someone was a car driver.

Compared to living in London or a Metropolitan area throughout the study period, living in either an urban area or a rural area throughout the period was associated with an increased likelihood of being a car driver of 1.54 and 1.57 respectively. This suggests that there is a difference in likelihood of being a car driver for those with stable circumstances living outside London or Metropolitan areas, but not those who move between settlement types. However, it should be noted that only relatively small numbers of the sample changed settlement type.

Chapter 3 of the evidence review found that young people have been taking up employment, forming relationships and having children later than in previous generations. This analysis has provided evidence that these transitions are highly influential in licence acquisition and car use, and hence supports the claim that these are important determinants of the lower car use of Millennials.

5.4 Summary

The three new strands of analysis have provided additional insights into the decline in car use of young people.

The analysis of NTS time-series data for residents of England found large increases in time spent at home for men aged 17-29 (increase of 80 minutes per day) and for women aged 17-29 (increase of 40 minutes per day) between 1995 and 2014. The trends apply across employment status and living situation sub-groups. Long-term change in the nature of employment - such as the increase of flexible working - and increasing use of ICTs are plausible reasons for these changes.

The analysis of Census data for commuters in England for 2001 and 2011 showed substantial change in the commuting behaviour of 25-34 year olds, attributable to the trend of more of them living in highly urbanised areas and this increasingly affecting their

choice of transport mode for commuting. Different hypotheses can be put forward for this, including transport system changes, geographic and economic changes, and changes in the life situations, values and social practices of young adults.

The analysis of Understanding Society data for 2009/10 to 2013/4 showed that socio-economic situation was an important factor affecting licence holding and the likelihood of acquiring a licence was found to be strongly associated with being in full-time employment or gaining employment. When looking at the relationship between life trajectories and car use, it was found that stable employment was a strong determinant of being a car driver. Forming a partnership was also positively associated with being a car driver, but living with parents was not different to living alone, or sharing with other adults, and can be refuted as being a major factor in explaining reduced car use in young adults. The analysis provides strong evidence to support the hypothesis that the patterns of young people taking up employment, forming relationships and having children later than in previous generations have been influential in reducing the car use of Millennials.

6. Summarising the Evidence and Implications for the Future

This chapter provides a synthesis of the findings of the literature reviews and secondary data analyses, and makes a qualitative assessment of the relative importance of the factors that have contributed to the observed changes in young people's travel behaviour and the processes that caused these changes. It discusses likely future trends, especially focusing on whether the travel behaviour of young people in the future is likely to revert to something closer to the trends observed in the 1950s-1980s, will continue as at present, or will show further change. One important element of that is whether current young adults, as they grow older, will themselves revert to the behaviour of previous older generations, or will continue as they are. The report ends by considering the implications of the findings for transport policy and practice.

6.1 Explaining the travel behaviour trends

6.1.1 A framework for assessing the effects of different factors

Table 8 provides an evidence-informed, qualitative assessment of the effects on young people's travel behaviour of the different societal trends and lifestyle changes considered in this study. This is retrospective in considering the changes that have happened since 1990 for Millennials compared to the pre-Millennial cohort and prospective in anticipating the future travel behaviour of the Millennial cohort and the post-Millennial cohort of young people. The assessments of **effects on travel behaviour** concern the magnitude of the effect of a given factor on the travel behaviour of young people, 17-29 years of age, in approximately the last 20 years. The assessments are informed by both the literature reviews and secondary data analyses, and have been developed using a framework for assessing the evidence.

Effects have been separated into five different categories - driver licensing, car access, trip frequency, mode use and car driving distance. Effects are assessed from strongly positive (+++) via negligible (0) to strongly negative (---), with ? indicating an ambiguous effect. The **effect type (to date)** for each factor is categorised as:

- Cohort effect - travel behaviour of Millennials has been different to previous cohort(s) when they were same age;
- Period effect - change in travel behaviour has been observed for all (or most) cohorts over last 20 years; and
- Age effect - cohort effect is being sustained for subsequent cohorts as part of a new profile of travel behaviour over the life course.

Confidence in the **certainty of effect (to date)** is expressed across three levels - low, medium and high; the differences primarily reflect the extent to which high quality data and information is available. **Likely continuation of trend** is based on the nature and evolution of the trend as reported in Chapter 3.

Anticipated future effects are separately identified for Millennials (now 17-29) and the next cohort (now <17).

- Now 17-29: stable - differences observed for Millennials compared to previous cohorts will be maintained as Millennials get older;
- Now 17-29: decline/increase - effects will reduce/increase as Millennials get older;
- Now <17: stable - when they become young adults, the behaviour of the next cohort will be roughly the same as the current behaviour of Millennials; and
- Now <17: decline/increase - the effect of a given factor will be smaller/larger for the next cohort when they become young adults than it currently is for Millennials.

Table 8: Assessment of the Effects of Societal Trends and Lifestyle Changes on Young People’s Travel Behaviour

	Effects on travel behaviour (to date)					Effect type (to date)	Certainty of effect (to date)	Likely continuation of trend	Anticipated future effects	Likelihood of effect (future)
	Driving licences	Car access	Trip freq.	Mode use	Car driving distance					
<i>Demographic situation</i>										
Postponing of parenthood	-	--	+	-- (car)	0	First cohort, now age	High	Stabilisation	Now 17-29: decline Now <17: stable	Medium
Increase in cohabitation	-	-	0	- (car)	-	Cohort & period	High	Stabilisation	Now 17-29 & <17: stable	Low
Migration to the UK	-	-	0	- (car)	-	Cohort	Medium	Very unclear	Now: 17-29 & <17: decline	Low
<i>Living situation</i>										
Living with parents longer	0	+	-	0	0	Mainly cohort	High	Stabilisation or intensification	Now 17-29: decline Now <17: increase	Medium
Decline in private home ownership	--	--	0	-- (car)	--	Mainly cohort	High	Intensification	Now 17-29: decline Now <17: increase	Medium
Increased urbanisation	--	---	0	--- (car)/ ++(PT)	---	Mainly cohort	High	Intensification	Now 17-29: decline Now <17: stable	Medium
<i>Socio-economic situation</i>										
Increased participation in higher education	-	--	-	-- (car)/ ++ (PT)	--	First cohort, now age	Medium	Stabilisation	Now 17-29: decline Now <17: stable	Medium
Increase in women’s labour force participation	++/0	++/0	++/0	++/0 (car)	++/0	First cohort, now age	High	Stabilisation	Now 17-29 & <17: limited effect	Medium
Increased work in the service sector	0	0	0	0	0	Cohort & period	Low	Stabilisation or intensification	Now 17-29 & <17: ambiguous	Low
Increase in low-waged, uncontracted work	--	--	-	-- (car)/ ++(PT)	---	Cohort & period	Medium	Intensification	Now 17-29: stable Now <17: increase	Medium
Decline in disposable income	--	--	--	-- (car)	---	Cohort & period	High	Intensification	Now 17-29: stable Now <17: increase	Low
<i>Information and communication technologies</i>										
Increased ICT use	-	-	-	- (car)	-	Cohort & period	Low	Intensification	Now 17-29: stable Now <17: stable/increase	Low
Use of mobile devices to arrange everyday life	0	0	0	+ (PT)	0	Cohort & period	Low	Intensification	Now 17-29: stable Now <17: stable/increase	Low
ICT use whilst travelling on public transport	0	0	0	+ (PT)	0	Cohort & period	Low	Intensification	Now 17-29: stable Now <17: stable/increase	Low
Increase in gaming	0	0	-	0	0	Cohort	Low	Intensification	Now 17-29: stable Now <17: stable/increase	Low

	Effects on travel behaviour (to date)					Effect type (to date)	Certainty of effect (to date)	Likely continuation of trend	Anticipated future effects	Likelihood of effect (future)
	Driving licences	Car access	Trip freq.	Mode use	Car driving distance					
<i>Values and attitudes</i>										
Extended youth	--	--	0	-- (car)	0	Cohort	Low	Unclear	Now 17-29: decline Now <17: stable	Low
Rise of pro-environmental attitudes	0	0	0	0	0	None	Low	Unclear	Now 17-29: stable Now <17: stable/increase	Low
Decline in cars as status symbols	-	-	0	- (car)	-	Cohort	Low	Unclear	Now 17-29: stable/decline Now <17: stable	Low
<i>Transport and mobility</i>										
Stricter driver licensing regime	-	-	0	- (car)	0	Cohort	Medium	Stabilisation	Now 17-29: stable/decline Now <17: stable	Medium
Increased car insurance costs	-	-	0	- (car)	0	Cohort	Medium	Stabilisation	Now 17-29: stable/decline Now <17: stable	Medium
Increased spending on transport	-	-	0	-- (car)	--	Cohort & period	Medium	Intensification	Now 17-29: stable/decline Now <17: stable	Low
Rise of shared mobility	-	-	0	- (car)/ + (bike)	- (car)	Cohort & period	Low	Intensification	Now 17-29: stable/increase Now <17: increase	Low

+ / ++ / +++ = weak positive / positive / strong positive effect; - / -- / --- = weak negative / negative / strong negative effect; 0 = negligible effect; ? = ambiguous effect

++ / 0 = positive effect until 2000s, since declined and disappeared

Intensification = trend is likely to become more pronounced; stabilisation = extent of change will likely be reduced and current situation will likely persist; reversal = trend will likely be reversed; (very) unclear = (very) difficult to indicate how trend may develop

The assessment of the **likelihood of effect (future)** reflects the confidence that the factor and its effects will continue to persist in their current manifestation and is expressed across three levels - low, medium and high. In no cases was there high certainty (given inherent uncertainty concerning the economy, politics, technology, etc.), but in some cases there was considered to be moderate certainty.

The example of postponing of parenthood is now used to illustrate the framework that was used to assess the evidence. In section 3.2.1, it was noted that there was a gradual steady increase in the proportion of women childless at 30 for those born between 1945 and 1975 with this trend stabilising/reversing slightly for those born between 1975 and 1983 (Berrington and McGowan, 2015). This equates to a trend for fewer men and women aged 17-29 becoming parents up to 2005. **Table 9** identifies evidence on the travel behaviour effects of parenthood from the literature and secondary data analyses (SDA) and shows how this was used to make assessments of the contribution of the trend to changes in young people’s travel behaviour since 1990.

Table 9: Evidence on Travel Behaviour Effects of Postponing of Parenthood

Travel Behaviour	Evidence on Effects of Parenthood	Assessment of Effects of Trend
Driving licences	Individuals with children are more likely to have a driving licence (except in the case of women looking after a family) (Berrington and Mikolai, 2014) Not starting a family given as a reason for not driving (SRA, 2015) Those with children more likely to acquire licence (Secondary Data Analysis - life trajectories).	Weak decrease in licence holding
Car access	Carless couples without children who have a child are more likely to acquire a car (Clark et al., 2016a)	Moderate decrease in car access
Trip frequency	Women living with their own children spend less time travelling; for men there is no difference (SDA - time use)	Weak increase in trip frequency
Mode use	No specific evidence, but lower car use expected due to lower licence holding	Moderate decrease in car use
Car driving distance	Men with a driving licence and children drive more miles whereas women with a driving licence and children drive fewer miles (Berrington and Mikolai, 2014)	Unaffected in aggregate

The travel behaviour effects of this trend were originally cohort-specific (with successive cohorts having an increasingly lower tendency to become parents and to get a driving licence, have access to a car, etc.), but have now stabilised and are age effects (driving licence holding, car access, etc. have shifted to a low level amongst 17-29 year olds and this is likely to be the new norm for the life course). Certainty regarding these effects is high since there is good evidence about the trend itself and of the effects of parenthood on travel behaviour. The age at which women start having children has stabilised hence it is suggested that the post-Millennial cohort of young people is not likely to be very different to Millennials in when they have children and the effects of this on travel behaviour. For current young adults (Millennials), the effects on travel behaviour will become weaker as some of them have children later in their life or take up driving for non-family related reasons. Given the stability of the trend and of the consistency of reported effects of parenthood on travel behaviour in the literature, it is fairly likely that this expectation of the future is correct.

6.1.2 Overall interpretation

The changes that have taken place in the travel behaviour of the 17-29 age group in the last 25 years are not simple to describe. They manifest themselves differently depending on the behaviour considered, for example driving licence holding or public transport use.

In some ways, the changes are consistent across the age group; in other ways, they are very different and depend on gender, socio-economic status, location and other characteristics. Taking the six higher-level categories of societal trends, we conclude on their role for current generations of young people as follows:

- Demographic situation - reduction in partnerships and parenting has contributed to a reduced need to have a car and to drive.
- Living situation - more young people are living in cities and this means they have less need to use a car and find alternative modes more useful.
- Socio-economic situation - lower full-time employment among young men, more unstable employment and lower disposable incomes have made acquiring and using a car less affordable. Increased participation in higher education has reduced the number of young people who require a car and increased public transport use.
- ICTs - ubiquitous use of mobile ICT devices has changed social practices, giving more flexibility about where activities are undertaken and making some travel less essential.
- Values and attitudes - environmental attitudes have not been shown to change substantially, but lower expectations to drive have emerged among certain sub-groups of the 17-29 age group for whom the car is no longer as aspirational as it once was.
- Transport and mobility - learning to drive and owning a car have become more difficult and costly. In areas where the availability of alternatives to driving, including reliable public transport and infrastructure for cycling and walking, has improved, cars are now less desirable or necessary for some young people.

These trends have generally influenced travel behaviour in the same direction (towards reduced car use). It is important to note that the trends are likely to have had interactive, complex effects, rather than distinct, separable effects. It is apparent that explanations for the observed trends in travel behaviour are found primarily outside the transport sector.

The evidence examined in this report shows that changes in socio-economic situation are the most important contributors to the change in young people's travel behaviour. This does not mean that all the influences have been unfavourable changes reducing the quality of life of young people. Some changes, such as increased participation in higher education, have offered increased opportunities for personal growth and have widened rather than constrained the range of available lifestyles. Changes in socio-economic situation are not the consequence of the 2007-8 global economic crisis and subsequent recession (although these deepened changes), but longer-term, structural developments that go back to the 1980s and 1990s. Particularly important have been increased higher education participation (which has postponed employment) (see section 3.4.1) and labour market transformations which have led to lower paid, less secure jobs for young adults (see section 3.4.4). A shortage of affordable housing has also particularly affected young adults, contributing to a reduction in disposable income (see section 3.4.5).

The socio-economic trends are intimately linked to changes in living situations and possibly in demographic situations and values and attitudes. Changes in young people's travel behaviour have been related to the declining significance of many of the traditional markers of adulthood - completing education, moving out to live independently, getting a job, getting married and then having a child. Regardless of the continued relevance of these traditional markers of adulthood to young people today, the realities of the labour and housing markets have made them unattainable for many.

The conclusion that a combination of societal trends has been responsible for the observed trends is in reasonable agreement with international reviews. Some other studies, particularly from the US, have concluded that economic factors (income and prices) are

primarily responsible for the trends (e.g. Blumenberg et al., 2016; King et al., 2016; Klein and Smart, 2017). Like this study, these studies recognise employment and income of young people as very important. Where this study diverges is that it finds the significance of overall economic trends (e.g. changes in GDP) is overshadowed by distributional issues: changes in the proportion of national income controlled by younger and older groups and in inequalities among young people are not captured in changes in the overall growth rate. In the UK, there has been a widening of the pay gap between younger and older workers and a larger increase in spending on housing for young adults than older adults (see section 3.4.5). In addition, both unemployment and underemployment are higher amongst young adults and 17-29 year olds have experienced a sharp increase in these compared to other age groups (see section 3.4.4). Amongst young people, there are differences in how these trends are playing out between men and women (see section 3.4.3), between those with and without higher education qualifications (see section 3.4.4) and between those who can and cannot access knowledge-economy jobs in large cities (see section 3.4.3).

For future research, it appears promising to explain developments over time in travel behaviours among young adults with reference to Bourdieu's (1986) forms of capital (see also Urry, 2007, 2012). He proposed a typology of forms of capital, namely economic capital (income, wealth), cultural capital (the credentials and customs acquired through education, ability to appreciate and engage with cultural goods), social capital (resources and connections embedded in social networks) and network capital (the capacity to generate and maintain emotionally, financially and practically beneficial relations with people at a distance). It could be a useful hypothesis that changes in young people's travel choices map on to changes in the extent and composition of each of these forms of capital that they possess, thus potentially uniting the social and economic dimensions discussed above, and opening new possibilities for cross-disciplinary understanding.

The influence of ICT use has been dismissed in the empirical studies we reviewed which were based on positive cross-sectional associations between ICT use and mobility. However, given long-term trends, it has been argued that activities based around ICTs may displace activities that are reliant on the car, with younger people in the vanguard of this (van Wee, 2015; Lyons, 2015). The absence of evidence on long-term effects of ICT use is a concern. We have presented evidence of increases in the amount of time spent at home (see section 6.3) which can be tentatively put forward to support the claims of a move towards greater ICT use in place of travel. Even if other factors were the initial causes of reduced car use, spending more time at home is likely to lead to a change in what people do and where they go. This could mean that people continue to use cars less even if the original causes of a fall in car use are no longer prevalent.

Studies reviewed in Chapter 4 identified the existence of unexplained cohort effects and attributed this to changes in lifestyles, attitudes and preferences (Delbosc and Currie, 2014a; McDonald, 2015). We are cautious about such claims. Unexplained change could be due to demographic, location, socio-economic and transport factors that have not been included or inadequately measured in statistical models, and values and attitudes may have changed not in advance of behavioural changes but partly as a consequence of them. There is a risk that the catch-all category 'lifestyles, attitudes and preferences' may come to function as a convenient label that directs attention away from questions about which of its elements have changed or remained the same. The category also fails to appreciate the potential contribution made by other changes, for instance in social norms and conventions, which this report has not been able to explore. Changes in social norms and conventions may not be immediately apparent but can change significantly over the time-scale of a decade or more.

What happens to current young people's travel behaviour in the next 10-15 years is perhaps less clear. It would seem that, at least for those who secure stable, full-time employment, a modest change towards greater car ownership and use can be expected. It

thus seems reasonable to assume that the difference in travel behaviour between those born before and after the early 1990s will be smaller at age 40 or 50 than it was at age 20 or 30. However, given that many young people have become accustomed to a lifestyle in which private car use is less central than it has been for previous generations, it is also likely that significant differences in travel behaviour will remain throughout their lives (representing a long-term cohort effect).

There are reasons to believe that this cohort effect is also likely to apply to the lives of subsequent cohorts. There is currently little evidence to suggest that the travel behaviour of the post-Millennial generation will be very different from those born in the 1980s and 1990s. If this is the case, what started as a cohort effect for Generation X and built up to the Millennials will become established as the new norm and represent an age effect where the development of travel behaviour over the life course differs for future generations from that which was seen prior to 1990.

It is important that policies in transport and other sectors reflect the fall in the proportion of young people with a driving licence or access to a car. This shift in young people's transport options means that their access to employment and social activities depends on there being alternatives to using a car. This entails both public transport provision and other mobility options, such as car and bicycle sharing. The change in young people's travel behaviour aligns with long-term aims to reduce the adverse impacts of transport use, such as air pollution and carbon emissions. As such, it should be welcomed since it may contribute to continued lower car use in this cohort. There are indications that some young people welcome lower car use. However, it is also possible that lower car ownership and use has adversely affected the quality of life and social mobility of some young adults by making it difficult to meet people face-to-face, to access employment or education, or to participate in leisure activities. It has not been the focus of this study, but it is urgent to understand the impacts of the observed decreases in mobility of young people on their current and future opportunities and wellbeing.

6.2 Future scenarios

In **Table 8** we have also assessed the likely future impacts of the reviewed societal trends. Taking again the six higher-level categories we summarise our expectations below:

- Demographic situation - we expect Millennials to become more like preceding cohorts as they get older (in having children, for example) and post-Millennials to delay transitions to adulthood in a similar way as Millennials have done (although this is not inevitable).
- Living situation - we expect Millennials to become more like their predecessors in middle adulthood (tending to move away from cities, for example) and trends to accentuate further for post-Millennials (i.e. renting and living in cities).
- Socio-economic situation - we are particularly uncertain about future employment prospects for Millennials, but see these as likely to remain less secure than they were for predecessor cohorts. We expect higher education participation to be largely unchanged for post-Millennials and for employment security to reduce further.
- ICTs - we expect ICT-related changes in social practices of Millennials to be maintained as they age and further changes to be adopted by post-Millennials, but implications for travel behaviour are unclear (as they have been for the last 25 years). This is a priority for research.

- Values and attitudes - we believe that the evidence on the whole suggests that the attraction of driving has weakened among Millennials compared to predecessors (noting that driving remains desirable and aspirational for many young people) and that this may largely remain the case as they age (compared to predecessors). This requires monitoring. There is considerable uncertainty regarding post-Millennials and the evidence suggests that they will be similar to Millennials, but this will be influenced by developments in transport (e.g. shared mobility, electric vehicles, automated vehicles) and labour and housing markets.
- Transport and mobility - we expect the cost of transport to bear more heavily on Millennials than on their predecessors beyond the age of 30, but not to the same extent as when they were younger. We also expect the experience of post-Millennials to be largely similar to Millennials, but this will depend on macro-economic conditions for which there is great uncertainty. Tentatively, we expect shared mobility to be taken up more by both cohorts (in part because the specific business models, operational logics and institutional arrangements of shared mobility are likely to change significantly compared to those prevailing at present).

The future outlook has also been contemplated in recent literature. Several authors expect that Millennials will become more similar to predecessors beyond the age of 30, but that a lengthy period of urban living and limited car use means that lower car use could prevail (Berrington and Mikolai, 2014; SRA, 2015; Hjorthol, 2016). The opportunity for transport policies to facilitate lower car use by Millennials in later adulthood is emphasised by McDonald (2015) and SRA (2015).

While these expectations are plausible, they fail to recognise differences in outcomes within the Millennial cohort and differences in possible outcomes within the post-Millennial cohort. Key to the future is whether inequalities increase in the labour and housing markets, in access to education and health, and in wealth from inheritance and the spatial nature of these (between different regions of the UK and within localities). Societal trends in the last 25 years have led to greater polarisation in the travel behaviour of young adults (with more non-car drivers). This trend of increasing difference within a generation may well continue into the future.

Kuhnimhof et al. (2012), McDonald (2015) and Iacono and Levinson (2016) have argued that quantified assessments of future travel demand should explore how sensitive forecasts are to uncertainty in the factors affecting travel demand. For McDonald (2015, p9) “[l]ong-range transport plans need to reflect this uncertainty by considering future scenarios where Millennials maintain their lower levels of automobility [car use] versus returning to the patterns of earlier generations”. Some studies (Stokes, 2013; Sivak and Schoettle, 2015; Collet and Madre, 2016; Vij et al., 2017) have applied relatively simple methods to explore the implications of different assumptions about the future progression of licence holding and car access to generate a range of forecasts for future car use. These can help to encourage debate about transport policy.

Collet and Madre (2016) conducted the most sophisticated analysis of future scenarios that we have encountered, based on data on adults from French ‘car fleet’ surveys from 1994 to 2011. They estimated age-cohort models showing that generally car ownership and use growth have slowed down in recent years due to an increase in fuel prices and low increases in household income. They also found the following cohort effects:

- Men’s car ownership - large decrease for those born after 1974.
- Women’s car ownership - decrease for those born after 1974.
- Men’s car use - decrease for those born after 1944.
- Women’s car use - decrease for those born after 1964.

Using these results, they made projections for car ownership and use in 2060 for three scenarios relating to fuel price, fuel efficiency and incomes. They also extrapolated cohort estimates into the future based on the decreasing cohort trend for men and assuming that it applies to women but is delayed. They found the “three scenarios forecasted a decrease in the average annual mileage per driver from 2010, but at different paces”.

Alternative scenarios should be explored based on a range of values for factors long known to influence travel demand such as residential settlement type, personal income and fuel price. In this study, we have also identified other factors that are quantifiable and should be considered such as employment status, security of employment and housing tenure. Projections of future travel demand should not assume that the effects of factors known to influence travel behaviour are fixed over time (e.g. sensitivity of car mileage to personal income). Differences in travel behaviour relationships between age/birth-cohort groups should be considered as well as changes in these over time.

In summary, a process for generating future scenarios could follow this outline:

1. Decide behaviours/outcomes of interest;
2. Segment population by age and by birth-cohort groups;
3. Decide whether to segment further (e.g. by gender, education) based on knowledge of what factors influence the behaviours/outcomes of interest;
4. Identify travel behaviour for each segment (these could simply be average values, distributions of values or relationships between behaviour and key influencing factors such as income and settlement type);
5. Project population based on assumptions about:
 - a. Future demographic change and changes in socio-economic and location factors;
 - b. Future changes in age/birth-cohort behavioural parameters.

Examples of key uncertainties around which future scenarios could be constructed include the following:

- Differentiation in urbanisation – whilst there is a general trend towards urban living, there are still questions about where urbanisation will take place. Will there be further concentration in London? Within urban areas, will more young people live in central locations?
- Housing tenure – will there be a further trend towards renting or a reversal of this trend towards owner-occupation?

Taking this forward will require a dedicated research project to develop a suitable model. It will also require well-informed evidence on travel behaviour relationships. Research requirements to take this forward will be discussed next.

6.3 Research recommendations

It became apparent from the evidence review that limitations remain in how far changes in young people’s travel behaviour have been explained and this limits the ability to generate well-informed expectations of future scenarios for travel demand. Key gaps identified are the following (research options responding to them are set out in Appendix B):

- Comprehensive assessment of the extent to which cohort differences in young people's travel behaviour in Great Britain can be explained by changes in their life circumstances. See option A in Appendix B for further details.
- Typical development paths in young people's lives and the travel behaviour associated with them (option B).
- Qualitative accounts by young people themselves of their unfolding lives and travel behaviour along with comparative accounts by older adults of their early adulthood. These will help to understand the influencing factors on travel behaviour and the impacts of travel behaviour on life opportunities (option C).
- The relationship between young people's ICT use and travel behaviour and how it has developed and is developing over time (option D).

As previously noted, it is important to recognise that influencing factors are likely to have interactive, complex effects, rather than distinct, separable effects on young people's travel behaviour. A comprehensive schema or model of how those interactions operate does not yet exist. An attempt could be made to develop this, drawing upon different theories and evidence, with a view to generating a hypothesis (or hypotheses) for testing in further research.

6.4 Conclusions

Driving licensing among young people peaked in 1992/4, with 48% of 17-20 year olds and 75% of 21-29 year olds holding a driving licence. By 2014, driving licence holding had fallen to 29% of 17-20 year olds and 63% of 21-29 year olds. Between 1995-99 and 2010-14, there was a 36% fall in the number of car driver trips per person made by people aged 17-29, with a fall of 44% for men and 26% for women. There has been a small increase in trips per person by public transport at the same time as car trips have fallen over the last twenty years, but walking trips per person have fallen and cycling trips per person have seen no notable change. Men born from about 1980 onwards are reaching 30 years of age with substantially lower licence rates and car driving mileage than previous cohorts. This cohort effect is also apparent for women but smaller in magnitude.

The changes in travel behaviour observed in the UK since the 1990s are broad and complex, and vary substantially within the young population, including between men and women. Changes in travel behaviour have been driven by changes in young people's socio-economic situations (increased higher education participation, rise of lower paid, less secure jobs and decline in disposable income) and living situations (decline in home ownership and re-urbanisation). These are long-term changes that predate the 2007-8 global economic crisis and subsequent recession. Closely tied to the changes in young people's socio-economic and living situations are changes in when people start a family, their social interactions (substituting face-to-face interaction with digital communication, for example) and the importance that people attach to driving. It is not possible with the information available to quantify the importance of each of these factors or to say the order in which they began to exert an influence. They should be treated as interconnected phenomena.

The concept of a delayed transition, or even non-transition, into a traditional form of 'adulthood', marked by completing a course of education/training, leaving the parental home to live independently, getting a job, getting married and then having children, serves as a useful basis for considering the combined set of societal changes because it has been shown that car use is strongly associated with these markers of adulthood. However, it is important to explore the extent to which this 'delayed adulthood' has been a matter of choice or the consequence of constraints imposed by changes in labour and housing markets.

Changes in transport conditions have also played a role. There is good evidence that young people have been deterred from driving by high transport costs (especially car insurance costs). Reductions in driving and increases in public transport use have occurred to the greatest extent in London and other areas with high population density where alternatives to driving are more readily available and there are greater constraints on driving. This demonstrates that transport policies and investments can shape long-term trends - although interventions in other policy areas (such as housing and employment) may be more influential in shaping young people's travel behaviour.

Our expectation is that a modest change towards greater car ownership (or leasing) and use can be expected in the next 10-15 years for Millennials, although possibly only for those who secure stable, full-time employment. It thus seems reasonable to assume that the difference in travel behaviour between those born before and after the early 1990s will be smaller at age 40 or 50 than it was at age 20 or 30. However, given that many young people have become accustomed to a lifestyle in which private car use is less central than it has been for previous generations, it is also likely that significant differences in travel behaviour will remain throughout their lives (representing a long-term cohort effect). There are reasons to believe that this cohort effect is also likely to apply to the lives of subsequent cohorts. There is currently little evidence to suggest that the travel behaviour of the post-Millennial generation will be very different from those born in the 1980s and 1990s. If this is the case, what started as a cohort effect for Generation X and built up to the Millennials will become established as the new norm and represent an age effect where the development of travel behaviour over the life course differs for future generations from that which was seen prior to 1990.

It is important to recognise the new realities of the lives and travel behaviour of young adults when attempting to predict future transport use. In 2010-14, only 50% of 17-29 year olds had a driving licence and car in their household, whereas the figure was 62% in 1995-99. When forecasting future travel demand, it will be increasingly important to take account of the extent and pattern of car access across the population. There is a lack of data on the use of emerging transport options (shared mobility in particular) and it will be necessary to adapt survey and monitoring instruments to understand how these options are perceived and used by different age groups. In summary, there is the need to develop forecasting approaches that can generate scenarios for future travel demand which account for cohort differences in travel behaviour.

7. References

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Appendix A: Review Methodology

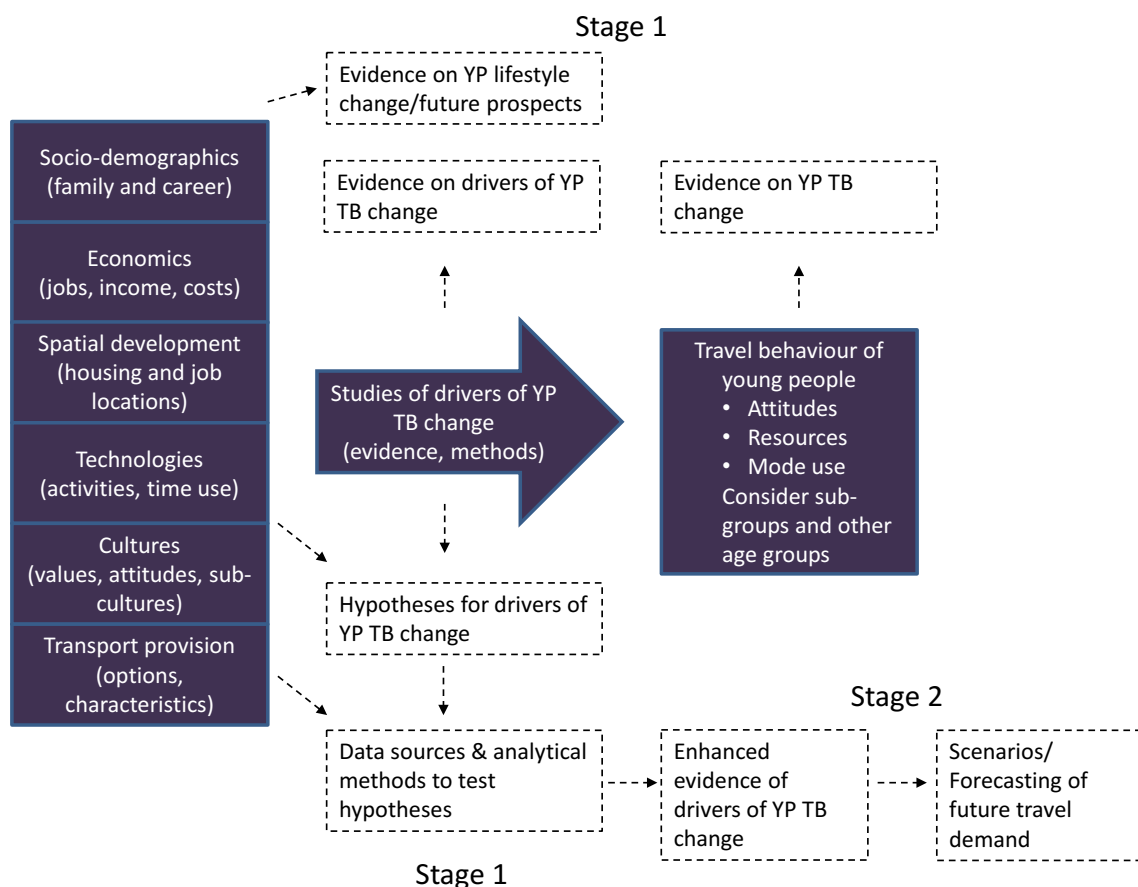
A short account follows on the general approach to identifying and reviewing published literature in this evidence review.

Thematic areas

The evidence review was guided by the following thematic areas (or themes) which covered (i) six different contextual areas potentially driving change to young people's lifestyles and travel behaviour; and (ii) travel behaviour trends of young people and attempts to explain these.

1. Socio-demographics
2. Economics
3. Spatial development
4. Technologies
5. Cultures
6. Transport provision
7. Young people's travel behaviour (YPTB)
8. Studies of drivers of YPTB change

The review areas (shown in dark blue) and their contribution to the evidence requirements (shown with dotted line boxes) are shown visually in Figure A and explained below.



Notes: YP = young people, TB = travel behaviour

Figure A1: Review Areas and their Contribution to Evidence Requirements

In the first part of the project (labelled Stage 1), it was required to review how young people's lifestyles have been influenced by societal trends since 1990 and how they might be influenced in the future. The task was to review broad trends occurring in the six thematic areas (recognising there will often be connections and interactions between trends in different areas) and to draw out how they have influenced young people's lifestyles.

Along with reviewing drivers of travel behaviour, it was important to understand as fully as possible in Stage 1 of the project how young people's travel behaviour (YPTB) has changed (and how this differs from changes for other age groups and differs amongst sub-groups within the young people population group). This has been studied quite substantially already in a British/English context based on National Travel Survey data. Nevertheless, there were potentially dimensions of travel behaviour that were not well understood (such as attitudes) or data sources that offer further insight.

There has been speculation and some attempts to empirically assess the effect of different drivers on young people's travel behaviour. It was important in Stage 1 of the project to review the studies that have attempted to do this and to consider the effectiveness of methods used and the robustness of evidence obtained. In all review areas, priority was given to UK evidence but evidence from other countries was also considered where it could provide insights worth examining in the UK context.

Following these reviews, it was anticipated that hypotheses could be put forward for factors that have influenced young people's travel behaviour and these hypotheses tested in Stage 2 of the project with analysis of secondary data. Finally, it was expected that the evidence obtained in the study could be used to suggest scenarios for future travel demand and make recommendations on how forecasts could be generated of future travel demand.

Literature search

The researcher responsible for each theme started by identifying sub-themes to cover (informed by referring to the topics identified in the review of declining driver licence holding by Delbosc and Currie (2013)), terms they would use for running searches for items of literature and sources they would use to search for items. The suggestions were compared between themes and re-orientations made to avoid overlaps and ensure as far as possible there were no gaps.

In addition, an approach was made to 53 researchers in the UK, Australia, Belgium, France, Germany, Japan, Netherlands, Norway, Sweden, and the USA, who were known to have published work relevant to the project, asking for their suggestions of work to be included, other people who might be approached, and especially information about their most recent work that might not yet have been published. A more general approach was made to anyone to come forward with work from the Universities' Transport Studies Group (UTSG) mailing list.

The results of the search process were recorded in a spreadsheet where for each theme a summary was provided of the search process (search terms, sources, indicative search, summary of searches) and details were recorded of each item of literature identified to be of potential use in the evidence review. Details included full citation, web link, abstract and priority rating.

Between 23 and 59 items of literature were identified for each of the six societal themes. The decision was made to treat the two travel behaviour themes as one theme for the ongoing review, since much of the literature on young people's travel behaviour (or relevant to it) both reported travel behaviour trends and sought to explain them. 37 items of literature were identified for this theme at the end of the scoping stage but with more items continuing to be received from researchers outside the project team.

In total, 272 items of potential importance were identified in the initial search stage. Priority ratings were given to each item of literature from reading the abstract taking into account the potential importance of the drivers/behaviour considered, the quality of the evidence available and the relevance to the UK.

While a degree of consistency was applied in the search process, the outcomes (number of items identified and priority scores) varied across themes due to differences in the degree of prior knowledge of the researchers, the coherence and characteristics of the theme, and the distance from the core terms of reference. Nevertheless, we reached the common position in each theme where a manageable number of high priority items was identified to consider (initially) in the full review stage (typically 15-25). Some flexibility was retained in the selection of items for full review with researchers open to reassessing priorities and considering new items (for example, items cited in reviewed papers) as they progressed their reviews.

Assessing the evidence

A pro forma was designed for the full evidence review stage to record information meeting the needs of the project. The design of the pro forma allowed some flexibility in what was recorded (e.g. strengths and caveats), which was necessary given the very different types of literature reviewed (ranging from official statistics reports to qualitative research findings).

The studies explicitly seeking to explain changes in young people’s travel behaviour employed a number of different research methodologies as summarised in **Table A** below.

Table A1: Contribution of Different Study Methodologies to Robust Evidence

Methodology	Data Used	Causal Inference Capacity	Limitations	Example
Trend analysis	Aggregate time-series data	Temporal plausibility is assessed	Strengths of associations not easy to quantify. Relationships may be spurious with other factors responsible	Le Vine et al. (2013)
Direct questioning in surveys	Questionnaire surveys	Relative importance of different factors are assessed	Only reveals role of factors included in questions Various possible biases in responses (memory, consistency, saliency, and social desirability)	Le Vine and Polak (2014)
Cross-sectional analysis	One-off questionnaire surveys	Statistically significant associations (with behaviour) are assessed	Time precedence is not confirmed Unmeasured factor(s) may be relevant	Berrington and Mikolai (2014)
Cohort analysis	Repeated questionnaire surveys (or retrospective questions in one-off surveys)	Relative importance of age, cohort and period effects are assessed	Sufficiently long period of data rarely available	Delbosch and Currie (2014a)
Behavioural dynamics	Panel data (or life history surveys/interviews)	Mechanisms of behavioural change are assessed	Short-period data only reveals factors relevant to short-term intra-individual change Unmeasured factor(s) may be relevant	Clark et al. (2016a)
Qualitative studies	Interviews, focus groups	Can reveal role of factors unknown in advance and processes explaining behaviour	Samples may not be representative Performativity bias where participants seek to portray themselves as responsible and rational actors who enact widely cherished ideals and norms	SRA (2015)

Researchers are largely reliant on data already collected and do not have the luxury of collecting new data. There are strengths and weaknesses of each methodology and hence each can be informative, but each can also be misleading without careful interpretation. In general, longitudinal data (time-series data, repeated cross-sectional data, panel data) and longitudinal analysis methods (trend analysis, cohort analysis, behavioural dynamics) are suited to explaining trends. The view of Delbosc and Currie (2013) was that “the whole search for causal influences is confounded by a lack of longitudinal studies with enough scale to enable reliable measurement of the likely causal factors”.

Some general observations can be made from the literature reviewed. The different study methodologies have all provided useful contributions to evidence. Cohort analysis is particularly suited to the research topic but requires the availability of multi-year data with suitable content. Great Britain has the advantage of the availability of suitable data in the form of the NTS. This has been relatively under-utilised for cohort analysis (with the exception of Tilley and Houston (2016)). There has been relatively little analysis directly examining how young people’s behaviour has changed as they get older - not surprising as it would have required dedicated studies to have been set up and the research topic has only gathered major interest since about 2013.

Appendix B: Research Recommendations

It became apparent from the evidence review that limitations remain in how far the trends in young people's travel behaviour have been explained and this limits the ability to generate well-informed expectations of future scenarios for travel demand.

The most important gaps identified were:

- Comprehensive assessment of the extent to which cohort differences in young people's travel behaviour in Great Britain can be explained by changes in their life circumstances. See option A.
- Typical development paths in young people's lives and the travel behaviour associated with them. See option B.
- Qualitative accounts by young people themselves of their unfolding lives and travel behaviour along with comparative accounts by older adults of their early adulthood. These will help to understand the influencing factors on travel behaviour and the impacts of travel behaviour on life opportunities. See option C.
- The relationship between young people's ICT use and travel behaviour and how it has developed and is developing over time. See option D.

Table B sets out a set of research options.

The highest priority research is option A of utilising NTS time-series data for a cohort analysis to explain changes in travel behaviour of young people since 1995. We also believe there will be considerable further value in option B of extending the analysis of life trajectories that was started in this study to obtain a fuller appreciation of the development of young adult lives and how this influences travel behaviour.

Option C entails qualitative research with young people on travel behaviour choices and would require primary data collection. It would have the key advantage of allowing young people to speak for themselves on how they perceive their situation and the choices that they are making. Factors that have been suggested but not measured in existing data sets (such as economic precariousness, ICT use) could be probed. It could also be investigated in what ways young people's lives are being affected by reduced mobility options. This could be taken forward in the form of a qualitative panel study in which young people are interviewed repeatedly over a 5 or 10 year period so that not only changes in overt behaviour but also in motivations, attitudes, meanings, norms and beliefs can be studied longitudinally.

Option D involves a longitudinal study of young people to understand how ICT use affects physical travel and vice versa, and how interactions between them change over time. It will require innovative data collection to incentivise young people to participate and protect confidentiality and it will be important to collect information on activity patterns, social interaction and time use, since the effects of ICT use on travel will often be indirect through their influence on these.

We judge the other options to be of lower immediate priority, but recommend they are re-assessed in the event of other research proceeding.

Table B1: Research Recommendations

Title	Data	Evidence contribution	Analytical methods	Challenges	Scale of effort	Priority
A. Cohort Analysis to Explain Changes in Travel Behaviour Since 1995	NTS time-series (repeated cross-sectional) 1995-current date	Diagnosis of stability and change in behavioural parameters over time (gender, income, etc.) Identification of age, cohort and period effects to assist understanding and for use in projections	Sub-group descriptive trend analysis Pseudo-panel analysis for different travel behaviour indicators (driving licence, car access, etc.) separately, and pseudo-longitudinal structural equation analysis	Data management and preparation (feasibility shown) Multiple dimensions of travel behaviour Creating macro-level trend variables for transport costs	Medium	High
B. Pathways to Adulthood and Travel Behaviour (building on analysis of life trajectories in this study)	Understanding Society 2008/09-13/14 (6 waves) and potentially British Household Panel Survey (BHPS)	Identification of different life trajectories in early adulthood ('pathways to adulthood') and predictors Relationship between life trajectories and travel behaviour Assessment of changes in prevalence of 'pathways to adulthood' over time (if BHPS analysis possible)	Innovative sequence classification methods (see Mikolai and Lyons-Amos, 2016) Multiple regression analysis of life trajectories Structural equation modelling of travel behaviour	Data management and preparation (feasibility shown) New analytical methods required for classifying sequences	Medium	High
C. Qualitative Research with Young People on Travel Behaviour Choices	New data collection involving interviews with young people at different age/life stage (and potentially their parents)	Understand how past developments, current situation and future expectation have shaped and are shaping travel behaviour. This will help to understand the influencing factors on travel behaviour and impacts of travel behaviour on life opportunities.	Thematic content analysis Narrative analysis	Recruitment of diverse sample	Large	High
D. Travel and ICT Use	New data collection using smartphone surveys with young people at different age/life stage, preferably set up as a panel study	Understand how ICT use affects physical travel and vice versa, and how interactions between them change over time	Descriptive statistics Linear models of varying levels of complexity	Recruitment and retentions of a diverse sample Privacy and data protection	Very large	High

Title	Data	Evidence contribution	Analytical methods	Challenges	Scale of effort	Priority
E. Comparing Young Adult's Time Use with Older Adults	UK 2014-2015 Everyday Life Survey and any earlier comparable surveys	Detailed breakdown of time use for different activities and at different locations	Descriptive statistics, including for sub-groups Trend analysis (if comparable surveys available)	Accurate identification of time spent using ICT	Uncertain - needs scoping	Medium
F. Measuring Economic Precariousness and its Role in Young People's Travel Behaviour	Labour Force Survey	Identification of suitable measures of economic precariousness Relationship between commuting mode/distance and economic precariousness (and changes in relationship over time)	Descriptive statistics, including for sub-groups Segmentation analysis to identify precarious group(s) Multiple regression analysis of commuting mode/distance	Identifying measure of economic precariousness that has greater explanatory power than conventional economic variables (i.e. employment status, income)	Uncertain - needs scoping	Medium
G. Travel Behaviour of First-generation Migrants and Second- and Third-Generation Ethnic Minorities	Understanding Society 2008/09-13/14 (6 waves)	Identification of differences in travel behaviour not accounted for by demographics, socio-economics and living situation	Multiple regression analysis for different travel behaviour indicators (driving licence, car access, etc.)	Sufficient sample available	Medium	Low (could be incorporated into B/C)
H. Attitudes to Transport	British Social Attitudes survey (BSAS) since 1990	Identification of change in attitudes over time Assessment of whether travel behaviour has become more consistent with attitudes	Descriptive statistics, including for sub-groups Trend analysis	Attitudes towards mode use only measured intermittently	Uncertain - needs scoping	Low
I. Willingness to Use Shared Mobility Services	New data collection involving survey on shared mobility services	Identification of awareness and willingness to use new mobility options	Descriptive statistics, including for sub-groups	Recruitment of diverse sample	Large	Medium
J. International Travel	International Passenger Survey	Assessment of change in amount of international travel of young people	Descriptive statistics, including for sub-groups	Availability of information to identify young people	Uncertain - needs scoping	Low