**Clark, J** and Minton, J. Driving Segregation: Age, gender and emerging inequalities. Chapter for *Geographies of Transport and Ageing.*Palgrave.

**6-8000 words including references. End of April**

***Q: is the issue word count or space (ie a word equivalent per table or image)***

***Q: is there any online appendix we could link to? Would it be ok to include in image a link to colour versions***

**Mobility [inequality by age, class - implications]**

**Gender**

**Generation**

**Cohort (increasing equality followed by increasing inequality (moving equal high to equal low by gender….implications; convergence on lower mobility cohort, for the future?)**

**- sub-issue of conversion of license holding to driving**

1. **Schematic table?  (cohort,  gender, broad characterisation)**
2. **Numeric table proportion of driving licence by age…also conversion**

**Add urban space issue transport poverty/ forced car ownership/ pushed to the periphery**

**[rethink the ‘public’ aspect of public transport?] – implications of the sharing economy? Resource managed more efficiently used by more people**

**INTRO:**

**Establish mobility and inclusion, multiple conceptualization of ‘age’ and car as ultimate mobility**

**LIT:**

1. **Proxy for intergenerational disadvantage**

**RQs: key importance of mobility and accessibility in social exclusion; amplified in later years. Young people as old people in waiting and recursive relationship between urban space and transport implications. Infrastructure changes have long term implications**

**CORE DATA:**

1. **Schematic table?  (cohort,  gender, broad characterisation)**
2. **Numeric table proportion of driving licence by age…also conversion**

**DISCUSSION:**

* **Urban space and transport**
* **Q of Age and physical isolation**
* **£££ Funding of transport and spatial dispersion of amenities**

**THE FUTURE:**

* **Platform economics (blur of private and public) and sharing economy as potential cures (Under-utilisation of assets relative to full capacity; more self-driving cars?). Active travel and greater longevity**

**[281 WORDS]**

THE PURPOSE OF THIS NEXT CHUNK OF TIME IS TO START DEVELOPING UP TO AROUND 2000 WORDS WORTH OF MATERIAL FOR JULIE’S PAPER. THIS PAPER WILL INTRODUCE THE DATA FROM THE LEXIS SURFACES AND SHOW HOW THEY CAN BE USED TO ILLUSTRATE A NUMBER OF PATTERNS AND TRENDS THAT HAVE OCCURRED IN RECENT YEARS IN THE UK. THESE PATTERNS AND TRENDS RELATE FIRSTLY TO THE PROPORTION OF PEOPLE THAT HAVE DRIVING LICENCES, AND SECONDLY TO THE PROPORTION OF THOSE WITH DRIVING LICENCES THAT HAVE ACCESS TO A CAR OR OTHER VEHICLE. THE DATA USED ARE ALL BUT THE FIRST TWO WAVES OF THE BRITISH HOUSEHOLD PANEL SURVEY, COVERING THE YEARS 1993 TO 2008 INCLUSIVE.

AS I AM WRITING, I WILL FIRSTLY IMPORT AND DISCUSS SOME EXISTING FIGURES, AND WITHIN THESE PROVIDE ADDITIONAL COMMENTS TO MYSELF ABOUT THE KINDS OF ADDITIONAL MODIFICATIONS REQUIRED. I WILL ALSO LEAVE SOME COMMENTS FOR MYSELF ABOUT WHICH TYPES OF TABLE SHOULD BE PRODUCED TO GO ALONGSIDE THE FIGURES. I SHOULD CONSULT WITH THE MATERIAL WRITTEN ABOVE IN ORDER TO MAKE SURE I AM KEEPING ON TRACK. THERE ARE A NUMBER OF INTERESTING ISSUES TO COVER IN THE DISCUSSION SECTION BUT I SHOULD ADDRESS THIS LAST TO MAKE SURE THE MORE IMPORTANT AND NECESSARY MATERIAL, SUCH AS DISCUSSING THE DATA USED AND METHODS, IS COVERED AND IN PLACE. I WILL ALLOW MYSELF TO LOOK AT THE CODE TO ANSWER A NUMBER OF QUESTIONS ABOUT THE TYPES OF CATEGORISATION USED, BUT WILL TRY TO AVOID PRODUCING ADDITIONAL FRESH ANALYSES. AS IN THE WRITING RETREAT, I WILL PAY ATTENTION TO THE NUMBER OF WORDS I BEGIN AND START EACH SESSION WITH, AND WILL SAVE EACH SESSION AS A SEPARATE DOCUMENT. THESE WILL BE CONTAINED ON THE DRIVING SEGREGATION REPOSITORY RATHER THAN IN THE WRITING REPOSITORY FOR NOW, THOUGH I MAY CHANGE MY MIND LATER.

THE ABOVE SECTIONS ARE WORTH WRITING DOWN AGAIN TO STRUCTURE THE UPCOMING TASKS. WRITING SOME TOPIC SENTENCES MAY BE A GOOD WAY TO DEVELOP THIS MATERIAL WHILE STILL WRITING IN SENTENCES AND PARAGRAPHS RATHER THAN A SERIES OF BULLET POINTS AND LISTS.

[348 WORDS]

# Acronyms

BHPS British Household Panel Survey

UKHLS United Kingdom Household Longitudinal Survey

ISCED International Standard Classification of Education

# Introduction [300-600 words]

Many preferences, attitudes, skills, competencies, propensities, proclivities, vulnerabilities and behaviours become established at a particular age or stage in the life course, then are largely maintained without substantial modification throughout later life. Stages in the life course in which these sustained patterns of being are particularly likely to be established, and then subsequently maintained, have been called ‘critical periods’ in life course epidemiology, in which the first few days, weeks, months and years of life are often considered of particular importance. The transition from childhood to adulthood should also be considered a critical period for adoption of a great many social skills and habits, including both the acquisition of a vehicle driving licence, and the propensity, amongst those licenced to drive, to own a car and drive on a daily basis.

The concept of critical periods in a life course perspective highlights the importance of understanding the conditions which people are exposed to at key life course stages. Exposure to favourable conditions during a critical period can help ensure a positive transition leading to better outcomes at all subsequent stages in the lifecourse; conversely poor conditions during a critical period can lead to individuals setting off on a much less favourable lifecourse trajectory. The concept of critical period within the life course can therefore provide important insights into two related substantive issues: firstly, the many differences in behaviour and outcomes that are often observed to operate across generational lines; and secondly, the persistence and apparent transmission of relative advantage or disadvantage from one generation to the next. Thinking about critical periods is therefore vital for helping to understand both large scale patterns of persistent differences, and persistent continuity, which exist when comparing generations.

In the UK, as in much of the rest of the affluent world, the acts of learning to drive, acquiring a driving licence, and subsequently owning a car and adopting a car-dependent lifestyle, all tend to begin around the critical period of the transition from childhood to adulthood, with the 17 the age at which people can first apply for, take, and potentially pass, a driving licence test. At this age both one’s peers and one’s parents comprise much of the ‘environment’ within which the critical period occurs, with both peers and parents likely exerting strong influence on the habits and preferences of young adults, and parents – through additional intermingling paths of genetic and economic transmission – likely a key influence on whether these preferences can be acted upon. In the case of learning to drive, a key factor is therefore affordability, and whether, regardless of the level of mobility preference in those making the transition from childhood to adulthood, the level of opportunity to act on such mobility preferences, to afford the increasing and increasingly expensive number of lessons required to pass a UK driving test, is equally available to all wishing to acquire this skill, and if not whether these inequalities of opportunity at a critical period have changed over time.

We also argue that placing an emphasis on childhood-to-adulthood as a key critical period for the acquisition of a driving licence, and subsequently to drive, is important for thinking about the kinds of mobility challenges and opportunity that may emerge over subsequent decades. From a critical-period focused life course perspective, the young adult is the parent of the middle aged adult and the grandparent of the pensioner. If vehicle-related mobility is not acquired by someone as a young adult, therefore, what might the implications be for mobility at older ages?

[585 WORDS]

NEXT STEPS: TO WRITE THE METHODS SECTION. TO MAKE SURE TO COVER EACH SECTION IN AS MUCH DEPTH AS NEEDED AND NOT ANY MORE. TO START TO FLESH OUT SOME OF THE SUBSECTIONS IN THE RESULTS SECTION.

# Methods [1000 words]

[CHUNK TWO START HERE]

## Data [500-750 words]

### Origins of survey

The British Household Panel Survey (BHPS) was a large longitudinal panel survey first carried out in 1991, and then in every subsequent year up until 2009. In the first year, known as a ‘wave’, a representative series of over 5 000 households were selected for interview from the postcode address file, producing a total sample size for individuals of over 10 000. In each subsequent wave attempts were made to interview all adult (16+) members of the initially selected household; if original sample members moved to form new households then attempts were made to interview them and all members of their new households. Additionally, from wave 9 (1999) a ‘booster’ sample was conducted of additional households living in Scotland and Wales; and in wave 11 (2001) a booster sample was collected for households living in Northern Ireland.1

Because a different set of questions was used to elicit information from individuals about driving licence ownership and car access in the first two waves compared with all subsequent waves, all results and analyses presented begin with the third wave (1993). The questions used are discussed below.

### Questions used

### Questions on driving/mobility status

The BHPS variables DRIVER and CARUSE were used to establish firstly whether an individual possessed a driving licence, and subsequently whether they had access to a car. From the third wave of the survey onwards adults are first asked “Do you have a full driving licence” (the DRIVER variable), and subsequently asked “Do you normally have access to a car or van whenever you want to use it” (the CARUSE variable) only if they respond to the DRIVER question in the affirmative. Within the first two waves respondents were first asked “Do you have a full driving licence?”, and then “Have you got a car or van, or is there one you have use of?”. This slightly different phrasing, along perhaps with a paper-based rather than computer-based interview system, meaning more individuals may have been asked the second question even if they answered ‘no’ to the question on licence ownership, led to very notable differences in the proportions of people who reported both owning a licence and having car or van access.[[1]](#footnote-1) Because of this inconsistency only data from the third wave onwards were used.

### Educational Groupings

The International Standard Classification of Education (ISCED) classifications were used to produce a three-fold grouping of populations by highest educational qualifications. Being an international classification system, this allowed people who had not received their education within the UK to be included in the analyses. Throughout the period in which the BHPS was run, ISCED used a seven-tier grouping of educational classifications, with the following designations: 0: pre-primary education; 1: primary education or first stage of basic education; 2: lower secondary education or second stage of basic education; 3: upper secondary education; 4: post-secondary non-tertiary education; 5: first stage of tertiary education; 6: second stage of tertiary education.[[2]](#footnote-2) The seven-fold ISCED groups were categorized into the following three groups for the purposes of this analysis: groups 0, 1 and 2 were collapsed into the category ‘no further’ education; groups 3, 4, and 5 were grouped into the ‘further vocational’ education group; and 6 and 7 were grouped into the category ‘further non-vocational’.

## Lexis Surfaces [250-500 words]

A Lexis surface is a visual arrangement of a variable (‘Z’) by age on one axis and year along another axis. Conceptually, a Lexis surface can be thought of as visual representation of a temporal surface much as a topographic map is a visual representation of a spatial surface, with age substituted for latitude, year (or period) for longitude, and the variable Z substituted for the surface’s ‘height’.

NEXT STEPS: COMPLETE THE LEXIS SURFACES SECTION; START WORK ON THE RESULTS SECTION; CORRECT AND COMPLETE ANALYSES AS AND WHEN NEEDED; REFER TO STRUCTURE DISCUSSED ABOVE

[WORDS COMPLETED: 1080]

# Results [3000 words]

CHUNK THREE: IN THIS CHUNK I WILL WRITE SOMETHING MORE ABOUT LEXIS SURFACES, AND DISCUSS SOME OF THE FIGURES PRODUCED AND WHAT THEY MEAN [I.E. THE RESULTS SECTION]. A SPECIFIC TARGET WILL BE TO WRITE 1500 WORDS. THE FOCUS SHOULD BE ON DISCUSSING GENDER DIFFERENCES, AND THEN THE MEDIATING OR MODERATING ROLE OF EDUCATIONAL QUALIFICATIONS IN NARROWING OR RAISING THE GAP. WITHIN THIS, THE ROLE OF COHORT CHANGE SHOULD BE USED, ALONGSIDE THE IDEAL TYPE (ANNOTATED) FIGURE, WHEN DISCUSSING THE PROPORTION OF PEOPLE WHO DRIVE; AND A SIMILAR DISCUSSION ABOUT CHANGES OVER PERIOD AND WITH AGE WHEN DISCUSSING CHANGES IN THE PROPORTION OF PEOPLE OF DIFFERENT AGES AND IN DIFFERENT YEARS WHO BOTH HAVE A DRIVING LICENCE AND HAVE ACCESS TO A CAR.

A MORE SPECIFIC GOAL WILL BE TO WRITE THE CAPTIONS FOR THE FIGURES, AND TO PRODUCE THE ANNOTATED/IDEAL TYPE IMAGE FOR DRIVERS WHO DRIVE.

Figure 1 shows Lexis surface level plots for both the proportion of BHPS sample members who have a driving licence (subfigures A, B and C); and the proportion of those BHPS sample members with a driving licence who also have access to a car or van (Subfigures D, E and F). Subfigures A and E show levelplots separately for each gender (females on the left and males on the right), whereas subfigures B and E show the levelplots further subdivided by highest educational qualification. Subfigures C and F contain a number of simple labels and divisions, indicating different regions within the Lexis surfaces, which will be referred to in this discussion of the results. Within each levelplot the shade of a cell indicates the proportion, with black indicating 100% and white cells indicating less than 50%.

Figure 1A shows the proportion of the adult BHPS sample who report having a driving licence, from 1993 to 2008, and for all ages from 17 to 80 years of age. It is clear from the difference in the shade of the right sub-panel (males) compared with the left sub-panel (females) that, historically, a larger proportion of adult males tend to have driving licences than females. A more subtle pattern in this figure is suggested by noting that in both panels, and in particular for the female panel, the cell shades tend to be darker near the bottom of the panels than at the top, when looking at both panels from the top to around one third of the way from the bottom. This indicates that, above around the age of thirty years, younger adults tend to be more likely to have a driving licence than older adults. As largely the same panel of individuals are being followed each year, and only a very small proportion of people possessing driving licences then have these licences revoked and have to take the test again, this difference in shades is suggestive of changes in driving licence ownership rate by cohort, with successive cohorts being more likely by a given age to possess a driving licence than earlier cohorts at the same age. By comparing similar regions (combinations of age and year) in the male and female panels it is also apparent that levels of driving licence ownership between males and females have tended to converge over successive generations. To look at this further, consider the region indicated by the letter A in figure 1C, and above the first diagonal dashed line in the figure; this broadly demarks cohorts born before around 1940. Within this broadly defined region of the Lexis surfaces, the cells are much darker for males than for females, with the proportions of males with driving licences around 90%, and the proportions of females with driving licences from similar cohorts ranging from around 55% to 70%. Next consider the region indicated by B in figure 1C, demarcated by the first dashed line above and another parallel diagonal dashed line below. This broadly indicates cohorts born between around the early 1940s and the late 1950s. The figures. The difference in the cell shade in this region between the male and female panels has reduced, with the proportions of males with driving licences increasing slightly from around 90% to 95% and above, and the corresponding female driving licence ownership rates increasing from around 70% to over 80%. The region indicated by the letter C in the Figure 1C indicates cohorts born from around the early 1960s to around 1975. For these cohorts the proportion of males with driving licences has remained high, at around 95% or above, whereas the proportion of females with driving licences has increased further, from around 80% to around 90%. Finally, we can consider the bottom right corners of the panels, indicated by letter D on figure 1C. This shows driving licence rates for people born after around 1975. What is striking about these younger cohorts is that driving licence rates have fallen for both genders compared with earlier generations, reversing a trend towards higher driving licence ownership which had been continuing for many generations. It is also noteworthy that these falls in licence rates have been in both genders, reaching around 75-80 for some of the newer cohorts within this Lexis surface region.

The complex patterns described above can to some extent be simplified in to a ‘pen portrait’ about differences between, and gender differences within, successive generations. The generations in the region A, born before around 1940, were characterized by fairly high levels of auto-mobility for males, and substantially lower levels of auto-mobility for females, with females perhaps around four or more times less likely to have a driving licences than males of the same age. Generation ‘A’ was therefore something of a ‘mixed mobility; high gender inequality’ generation.

This if the female and male panels indicated by the letter A in Figure 1C, and above the first dashed line in figure 1C, are compared then the region is much darker for males than females, with licence ownership rates typically around 90% or higher for males

D

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| E:\repos\driving_segregation\figures\final_deck\07g - proportion of dlos  - by age, year, sex.png | E:\repos\driving_segregation\figures\final_deck\09g - proportion of dlos  - by age, year, sex, highqual.png | E:\repos\driving_segregation\figures\final_deck\07g - proportion of dlos  - by age, year, sex.png  C  B  D  A | E:\repos\driving_segregation\figures\final_deck\10g - proportion of drivers driving - by age, year, sex.png | E:\repos\driving_segregation\figures\final_deck\12g - proportion of drivers driving - by age, year, sex, highqual.png | E:\repos\driving_segregation\figures\final_deck\10g - proportion of drivers driving - by age, year, sex.png  E  C  B  A |
| A) The proportion of BHPS sample respondents with a driving licence, by gender | B ) Driving licence ownership, by gender and highest qualilfication. | C) Driving licence ownership. Annotated. | D) The proportion of driving licence owners with access to a car or van, by gender | E) The proportion of driving licence owners with access to a car or van, by sex and highest educational qualification. | F) Drivers who drive. Annotated. |

Figure 1 Lexis surfaces showing the proportion of BHPS sample members who have driving licences (A-C); and, of those sample members with driving licences, who also have access to a car or van (D-F). In all figures year runs horizontally from left to right, and age runs vertically from bottom to top. Within each levelplot the shade of a cell indicates the proportion, with black indicating 100% and white cells indicating less than 50%.

# Discussion

## Limitations

The BHPS was superceded in 2008 by the UK Household Longitudinal Study (UKHLS), also known as Understanding Society. From the second wave onwards, original sample members from the BHPS were incorporated into the UKHLS, meaning the same households and individuals who first joined the BHPS in 1991 can be followed for a number of additional years. Unfortunately, many of the questions and classifications of responses are inconsistent between BHPS and UKHLS, meaning it has proved problematic to ‘extend’ the observations shown above beyond 2009 using the UKHLS. This is particularly the case when seeking consistent categorization of highest educational qualification, which we found to be a powerful means of distinguishing between sub-populations in terms of APC trends; the ISCED categorisations used in the BHPS were asked only in wave F of the UKHLS, and only as part of an immigrant and ethnic minority booster sample, with regards to qualifications obtained abroad.[[3]](#footnote-3) In principle, however, the period of observation can be extended to more recent years using UKHLS. This could be particularly informative as the UKHLS covers the period after the 2008 Global Financial Crisis and subsequent UK-wide recession; this recession is notable for its sluggish recovery, including a continued stagnation in wages and living conditions for much of UK society. We expect the trends towards decreasing mobility amongst those with lower educational qualifications to have worsened as a result of these changes, and so it should be a priority to explore this further.

The complex sampling and questionnaire design of the BHPS has both advantages and disadvantages, with the main advantage being that individuals can be tracked through time and so the effect of changes in individual circumstances on other outcomes estimated. A disadvantage is that, though the BHPS was initially drawn from a representative sample of the UK population, both selective attrition and the booster samples mean it can become somewhat less representative of the UK population over time.2 Within the analyses presented here, the BHPS is presented ‘as is’, without attempts to explicitly follow the same individuals over time or to analyse the influence of specific changes in household or individual circumstance on mobility outcomes; however the BHPS has been used to allow these analyses to be explored in subsequent research.

# References

1 Taylor MF, Brice J, Buck N, Prentice-Lane E. British Household Panel Survey: User Manual, Volume A: Introduction, Technical Report and Appendices. 2011.

2 Uhrig SCN. The Nature and Causes of Attrition in the British Household Panel Survey. Essex, 2008 https://www.iser.essex.ac.uk/files/iser\_working\_papers/2008-05.pdf.

1. Authors’ analysis [↑](#footnote-ref-1)
2. <http://uis.unesco.org/en/isced-mappings> Accessed 18 April 2017 [↑](#footnote-ref-2)
3. <https://www.understandingsociety.ac.uk/documentation/mainstage/dataset-documentation/wave/6/datafile/f_indresp/variable/f_isced11_dv> Accessed 18 April 2017 [↑](#footnote-ref-3)