CIS2014-11

Census Information Scheme
GLAINTELLIGENCE

Cycling to work in London, 2011

September 2014

Introduction

A key mayoral priority is to maximise the cycling potential in all areas of the city by encouraging more people to cycle in London, and improving the cycling infrastructure[1]. This paper examines census data on cycling, and reports on the personal characteristics of people cycling to work in London in 2011. This provides insight into the types of people most likely to cycle, as well as the areas in London they are most likely to live in. The analysis looks at borough-specific data, and also compares trends in cycling over time.

The 2011 Census recorded the main method of travel to work, applicable only to those who were in employment in the week before the census. Where two or more methods were used, the method used for the longest distance of the usual journey to work was recorded; the time the journey took was not considered. For example, if a person used a bicycle for one part of their journey and a train for the other, if the train journey was further in distance, their main method of travel would be train, even if the bicycle journey took longer in time. The population base of the data used throughout this report is people who were usual residents of London in employment a week before the Census.

This paper also identifies some strong correlations between cycling to work and personal characteristics. A correlation can be positive or negative. For example, a strong positive correlation between cycling to work and people in Professional occupations would indicate that areas which have a high proportion of workers cycling to work are likely to have a high proportion of people in Professional occupations. A strong negative correlation here would imply areas with high cycling to work rates would be likely to have low proportions of people in professional occupations.

In statistics, the Pearson product-moment correlation coefficient is a measure of the dependence between two variables X and Y, giving a value between +1 and −1. A value of +1 is total positive correlation, 0 is no correlation, and −1 is total negative correlation. A value between +/- 0.40 to +/- 0.69 indicates a strong relationship and a value of +/- 0.70 or higher suggests a very strong relationship. Only correlations considered strong or very strong have been reported on in this paper.

[1] As stated in the chapter five transport proposals of the Mayor's Transport Strategy. This can be viewed on the following link: http://www.london.gov.uk/sites/default/files/MTS_Chapter_5_pt2_0.pdf

Key Findings

Overview

London: There were 3.62 million people living in London that were in work in 2011, and of these, four per cent used a bicycle to travel to work.

The number of Londoners cycling to work in 2001 was 77,300. This number had doubled by 2011 to 155,300. This was not reflective of the rise in the overall population, which was 14 per cent.

In 2001, those cycling to work were much more likely to travel shorter distances than the same population in 2011. Of all cycling to work in 2001 in London, 23 per cent travelled less than 2km; however in 2011 this figure was ten percentage points lower at 13 per cent.

London v England & Wales: The proportion of Londoners cycling to work increased over the intercensal period, from three per cent in 2001 to four per cent in 2011, unlike the England & Wales share which was the same a decade later (three per cent in both 2001 and 2011).

Those resident in England & Wales cycling to work were twice as likely to travel less than 2km to work than those living in London. Three in ten (30 per cent) of this group in England & Wales travelled less than 2km, compared to just 13 per cent of their counterparts in London.

Geographic comparisons

Inner/outer: Inner London had over triple the proportion of people cycling to work than outer London; seven per cent (106,200 of 1.48 million) compared with two per cent (49,100 of 2.14 million).

Borough: Hackney had by far the largest proportion of residents cycling to work, at 15 per cent of the total. The borough with the the next highest proportion was Islington at ten per cent.

Hackney also saw the largest increase in residents cycling to work over the decade. In 2001, eight per cent of residents cycled to work, and this increased by seven percentage points to 15 per cent in 2011.

Although most inner London boroughs held notably higher shares of residents cycling to work, Newham was the exception. In this inner borough, only two per cent of workers used a bicycle to travel to work.

Personal characteristics

Sex: Males were more likely than females to cycle to work in 2011. Six per cent of working males travelled to work by bicycle (109,900 of 1.93 million), while just three per cent of females chose this method of travel (45,800 of 1.70 million).

Age: Over four in ten residents who cycled to work were aged 25 to 34, unreflective of the 33 per cent share this age group held among the total.

Residents aged 50 to 64 were less likely to cycle to work than average, holding an 18 per cent share in the total working residents population, but just 12 per cent in the cycling population.

Ethnicity: London residents of Asian ethnicities were a quarter as likely than their White British/Irish counterparts and a third as likely as average to cycle to work.

Qualifications: Those holding a level 4 (degree) and above qualification were the most likely to cycle to work. 48 per cent of workers held a degree, but 68 per cent of them cycled.

Occupation: Those in Professional occupations and Associate professional & technical occupations were more likely to use a bicycle to travel to work than any other occupation types, with six per cent of each group using this method of travel to work.

Hours worked: Five per cent of full-time workers and three per cent of part-time workers cycled to work.

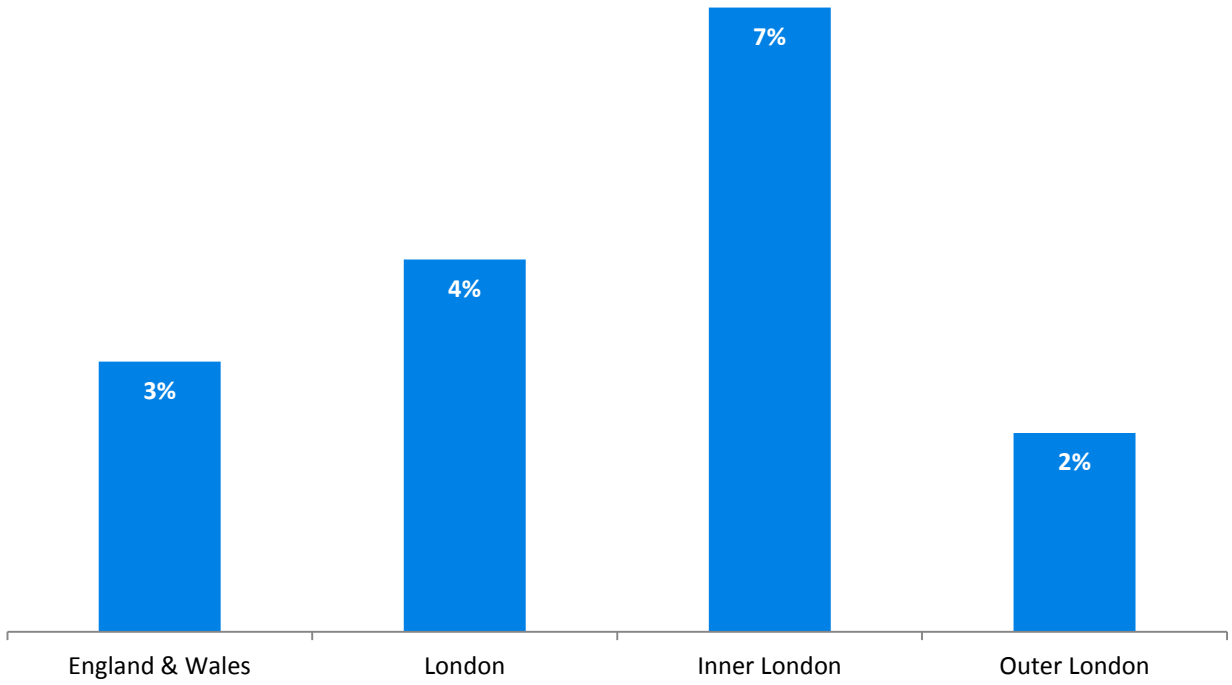
Overview

London, 2011

There were 6.12 million working-age residents (16 to 74) in London in 2011. Of these, 2.12 million were not in employment, and 380,700 were working from home. The remaining 3.62 million were travelling to work, and of these, four per cent (155,300) were doing so by bicycle. It is this group of people that this analysis predominantly focuses on[2].

London had a one percentage point higher proportion of workers cycling to work than England & Wales; three per cent (762,700 of 25.1 million) of all working residents in England & Wales cycled. Inner London had over triple the proportion of working residents cycling to work than outer London, at seven per cent (106,200 of 1.48 million) compared with two per cent (49,100 of 2.14 million, see Figure 1).

Figure 1: Percentage of workers aged 16 to 74 cycling to work by area, 2011



2011 Census table CT0050EW

Over time

In England & Wales in 2001, three per cent (651,000) of the working population (21.46 million) cycled to work. This share did not fluctuate over the intercensal period, and was still three per cent in 2011 (762,300 of 25.1 million). On the contrary, London's share of residents cycling to work increased by one percentage point, from three per cent in 2001 to four per cent in 2011. The number of London residents cycling to work has increased at a much higher rate over the intercensal period than the overall number of working residents in London. In 2001, there were 2.67 million Londoners working and travelling to work. This

[2] In the overview section of this paper, 'working residents' will refer to all usual residents aged 16 to 74 years that were in employment and travelling to work, excluding those working from home.

number increased by 36 per cent, to 3.62 million in 2011. The number of Londoners cycling to work in 2001 was 77,300. This number increased twofold to 155,300 in 2011

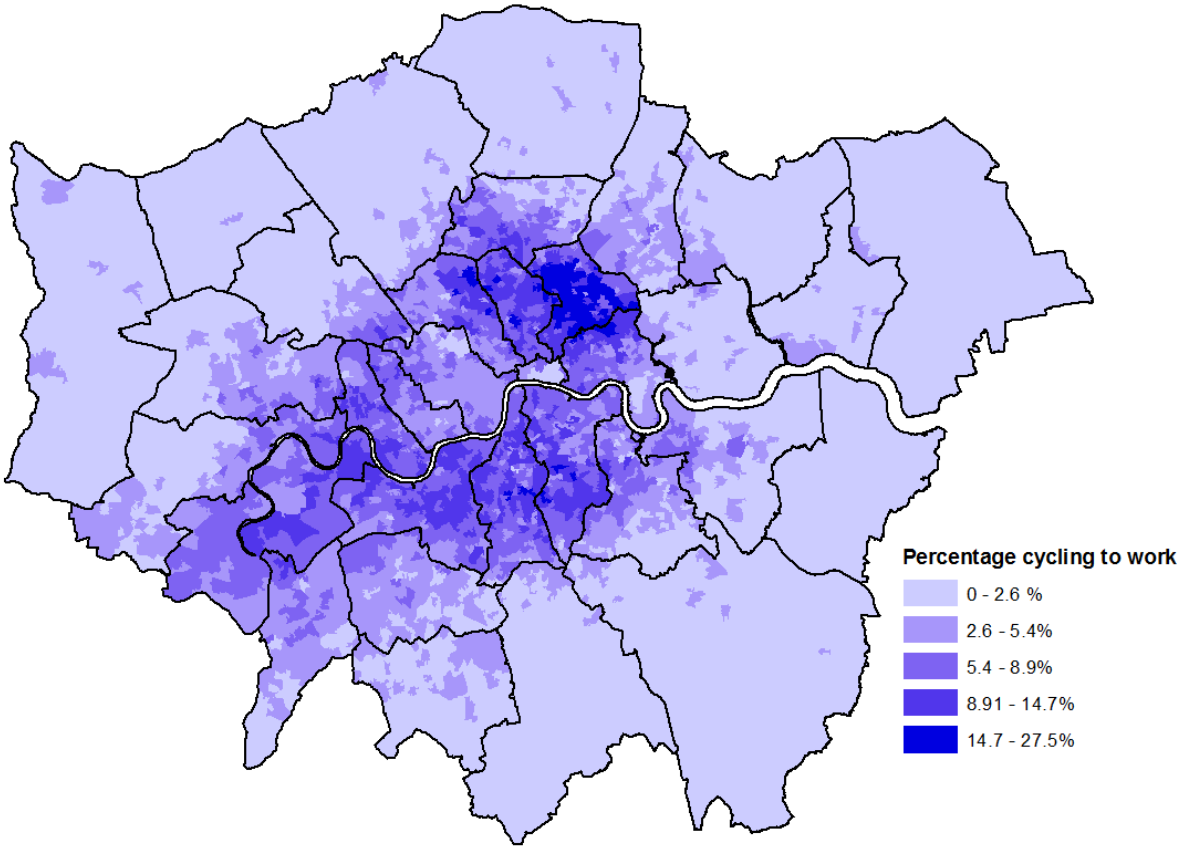
This increase in cycling to work over the intercensal period occurred predominantly in inner London. Inner London saw an increase of three percentage points in the share of usual residents cycling to work, from four per cent in 2001 to seven per cent in 2011. In real terms there were 62,700 more residents of inner London cycling to work in 2011 than was the case in 2001. This constitutes a growth of 144 per cent, from 43,500 to 106,200. By comparison, the number of working residents in inner London grew by 29 per cent, from 1.14 million to 1.48 million.

Outer London saw no increase in the proportion of residents cycling to work, with a share of two per cent in both 2001 and 2011. Numbers of cyclist did increase, but at the same rate as the overall population growth. The increase in total numbers of cyclists in outer London was 45 per cent over the ten year period, from 33,800 in 2001 to 49,100 in 2011.

Borough-level comparisons

The proportion of residents cycling to work varied significantly by borough; however, the majority were within two percentage points of the London average of four per cent, as shown in Figures 2 and 3.

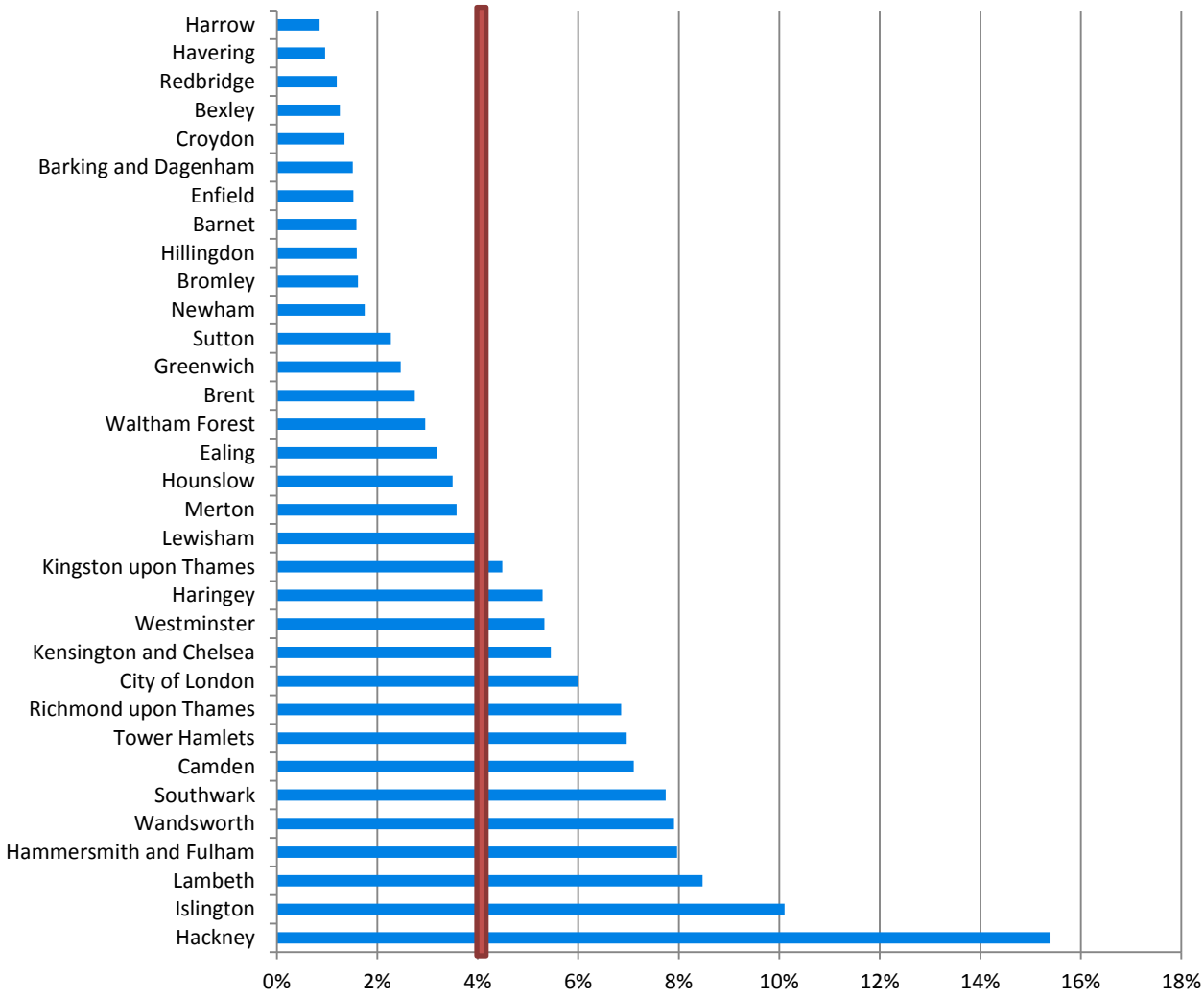
Figure 2: Map showing concentrations of all working usual residents aged 16-74 cycling to work, LSOA level, London, 2011



Source: 2011 Census table CT0050EW

Lower layer super output areas (LSOAs) were created from 2001 Census data, with an average of 1,500 persons in each.

Figure 3: Percentage of working usual residents aged 16-74 cycling to work by borough, London, 2011



Source: 2011 Census table CT0050EW
Please note the red line is the London average

Boroughs with the highest proportion were mainly found in inner London. The borough of Hackney had by far the largest share, with 15 per cent of all working residents[3] of Hackney using a bicycle to travel to work. The borough with the next highest proportion was Islington, where ten per cent of workers cycled to work. Lambeth, Hammersmith & Fulham, Wandsworth and Southwark all also had considerably higher than average shares at eight per cent for each.

The boroughs with the biggest increase in the rate of workers cycling to work were also found mainly in inner London. Table 1 shows the numbers and proportions of working residents in each borough cycling to work in 2001 and in 2011. Interestingly, the two boroughs with the highest rates of cycling to work in 2011 also had the largest increase in cycling to work over the decade. Hackney saw an increase of seven percentage points (8 per cent to 15 per cent), and in actual number terms, there was a 235 per cent

[3] 'Working residents' refers to working all usual residents aged 16 to 74 years that travel to work, excluding those working from home.

increase in the number of people cycling to work in Hackney (see Table 1). This is not in line with the increase in the working population living in Hackney, which grew by 76 per cent.

The increase in the proportion of workers cycling to work in Islington over the decade was also much larger than the average, from six per cent in 2001 to ten per cent in 2011. The number of workers who were using a bicycle as their main method of travel to work rose by 158 per cent; not consistent with the increase in the number of workers there, which was 54 per cent. Tower Hamlets also saw a large rise in the proportion of its working residents cycling to work, from four per cent in 2001 to seven per cent in 2011. The number of working residents in Tower Hamlets using a bicycle to get to work increased by 255 per cent (the largest increase of all boroughs). However, there was also significant population growth in Tower Hamlets over the decade (85 per cent), which may account for some of the growth in cycling.

Although most inner London boroughs had notably higher shares of working residents cycling to work compared to outer London, Newham was the exception. In Newham, only two per cent of workers used a bicycle to get to work in 2011; half the proportion of the London average. However, this borough is very close to the border of inner and outer London, and in other classifications has been considered an outer London borough due to its characteristics being more similar to outer London than inner London boroughs.

Boroughs with the lowest shares of workers cycling to work in 2011 were situated in outer London. Just one per cent of all workers living in Harrow, Havering, Redbridge, Bexley and Croydon cycled to work. Kingston upon Thames was the only outer borough that differed from this trend, where people cycling to work held a four per cent share (3,300) of the total workers; two percentage points above the average for outer London.

The boroughs that saw little or no increase in workers cycling to work over the intercensal period were situated in outer London, mostly in the west. Overall, the proportion of workers cycling to work in London increased by one percentage point over the intercensal period, from three to four per cent, and in number terms by 101 per cent. Despite a 24 per cent increase over the intercensal period in the population of working residents in Hillingdon, numbers of those people cycling to work decreased by five per cent (see Table 1). There was a 21 per cent increase in the population of working residents in the outer boroughs of both Sutton and Barking & Dagenham over the decade. However, Sutton saw just a five per cent and Barking & Dagenham ten per cent increase in the numbers of working residents using a bicycle to travel to work.

Table 1: Numbers and percentages of all usual residents aged 16 to 74 travelling to work in London by bicycle, borough-level, 2001 and 2011

Borough	2001		2011		Change in number	Percentage point change
	Number	Percentage	Number	Percentage		
Barking and Dagenham	**1,000**	**2%**	**1,100**	**2%**	**100**	**10%**
Barnet	1,400	1%	2,400	2%	1,000	71%
Bexley	1,000	1%	1,300	1%	300	30%
Brent	1,900	2%	3,700	3%	1,800	95%
Bromley	1,300	1%	2,200	2%	900	69%
Camden	3,400	5%	6,700	7%	3,300	97%
City of London	70	2%	200	6%	130	186%
Croydon	1,600	1%	2,100	1%	500	31%
Ealing	3,200	3%	4,800	3%	1,600	50%
Enfield	1,400	1%	1,900	2%	500	36%
Greenwich	1,300	2%	2,700	2%	1,400	108%
Hackney	**4,900**	**8%**	**16,400**	**15%**	**11,500**	**235%**
Hammersmith and Fulham	3,900	6%	7,100	8%	3,200	82%
Haringey	2,400	3%	5,900	5%	3,500	146%
Harrow	800	1%	900	1%	100	13%
Havering	900	1%	1,000	1%	100	11%
Hillingdon	**2,000**	**2%**	**1,900**	**2%**	**-100**	**-5%**
Hounslow	3,200	4%	4,100	3%	900	28%
Islington	**3,800**	**6%**	**9,800**	**10%**	**6,000**	**158%**
Kensington and Chelsea	2,100	4%	3,700	5%	1,600	76%
Kingston upon Thames	2,300	4%	3,300	4%	1,000	43%
Lambeth	5,400	5%	12,900	8%	7,500	139%
Lewisham	2,100	2%	5,200	4%	3,100	148%
Merton	2,200	3%	3,400	4%	1,200	55%
Newham	1,200	2%	2,200	2%	1,000	83%
Redbridge	1,000	1%	1,400	1%	400	40%
Richmond upon Thames	3,500	5%	5,800	7%	2,300	66%
Southwark	4,000	5%	10,500	8%	6,500	163%
Sutton	**1,900**	**3%**	**2,000**	**2%**	**100**	**5%**
Tower Hamlets	**2,200**	**4%**	**7,800**	**7%**	**5,600**	**255%**
Waltham Forest	1,700	2%	3,300	3%	1,600	94%
Wandsworth	5,500	5%	12,800	8%	7,300	133%
Westminster	2,500	4%	5,100	5%	2,600	104%
London	**77,300**	**3%**	**155,300**	**4%**	**78,000**	**101%**

Source: 2011 Census table CT0050EW and 2001 Census table TT011
Highlighted cells show boroughs where the change over the decade has been dissimilar to the average change over time for London.

Origin – Destination

In July 2014 the Office for National Statistics (ONS) released origin-destination data, otherwise known as flow data, cross tabulated with a number of variables, one of which being method of travel to work. These data tell us how many people live in one place and work in another. For example, how many people live in Hackney, but work in the City of London. The following short section examines data on origin-destination and cycling to work, and reports on the areas of residence of cycling workers, and the areas they work in. The population base of these data is all usual residents aged 16 and over[4] in employment and cycling to work in 2011[5].

Table 2: Place of residence by place of work, all working residents cycling to work aged 16 and over, inner, outer and rest of England & Wales, 2011

Place of residence	Place of work			
	Outer London	Inner London	Rest of E&W	Total
Outer London	24,500	19,000	2,100	**45,500**
Inner London	5,500	91,300	1,100	**97,900**
Total	**29,900**	**110,300**	**3,200**	**143,400**

Source: 2011 Census table WU03UK

Figure 4: The percentage of all workers cycling to work, inner, outer and the rest of England & Wales, 2011

Source: 2011 Census table WU03UK

[4] The population base of all tables used from here on in the report is all usual residents aged 16 and over in employment a week before the census, unlike the previous analysis which was on the age group 16 to 74. Any reference to working residents from here will be working residents aged 16 and over, excluding those working from home.

[5] Excluding any person whose place of work is working on an offshore installation, no fixed place of work, or working outside the UK. There were 12,200 London residents cycling to work with one of these places of work in 2011.

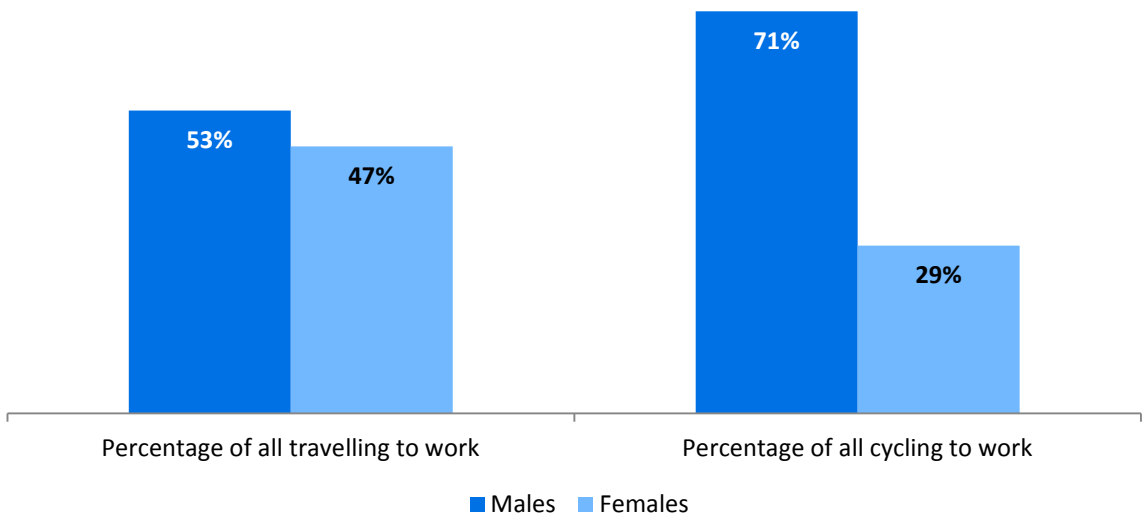
Table 2 and Figure 4 show the numbers and percentages of all people resident in inner and outer London cycling to workplaces in inner, outer and outside London. In 2011, 45,500 outer London were cycling to work. Of those, just over half were travelling to work somewhere within outer London, and just under half were travelling into inner London by bicycle. One in twenty were cycling from outer London to a workplace outside of London.

The cycling to work origin-destination data for people resident in inner London showed very different patterns to that of outer London. There were 97,900 people living in inner London using a bicycle to travel to work in 2011. The vast majority of these (93 per cent) cycled to a workplace destination within inner London. Only six per cent of inner London residents cycled to an outer London borough to work, and one per cent cycled to a workplace destination outside of London.

Sex

There were 1.93 million men and 1.70 million women aged 16 and over travelling to work in London in 201, with men being much more likely to cycle to work than women, at seven in ten (109,900) compared to just under three in ten (29 per cent or 45,800) females (see Figure 5). In 2011, of all males travelling to work, six per cent did so by bicycle (109,900 of 1.93 million), while three per cent of females (45,800 of 1.7 million) chose this method.

Figure 5: The percentage of all those travelling to work and all those cycling to work that were males and females, London, 2011

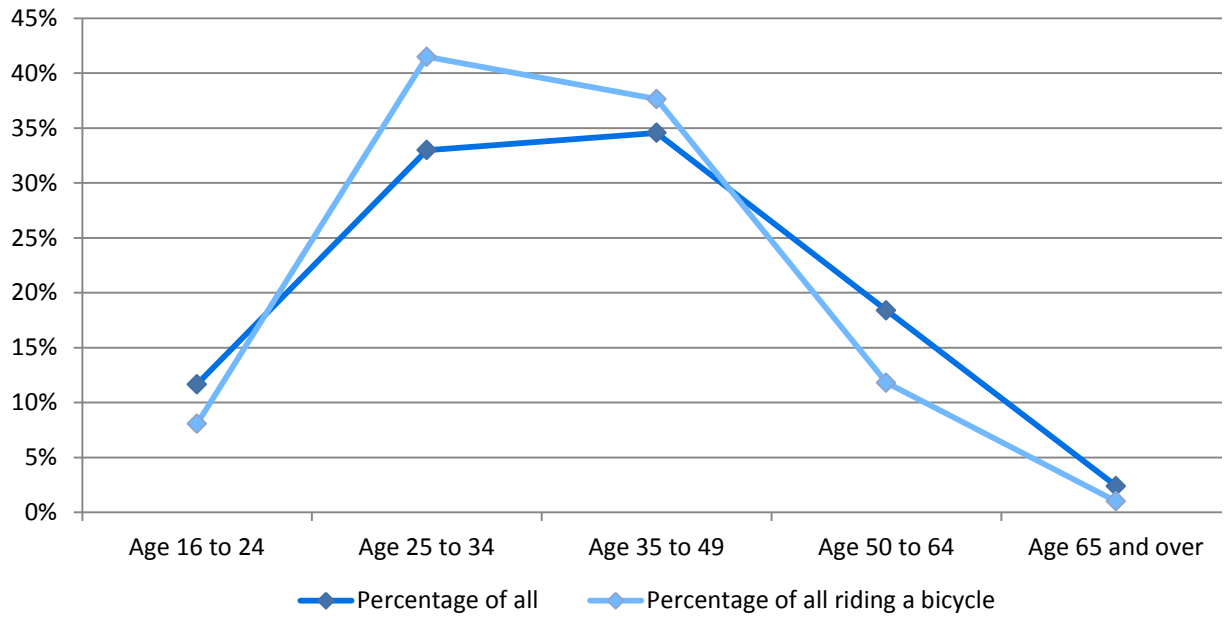


Source: 2011 Census table DC7101EW

Age

There were some notable differences in cycling to work rates between different age cohorts in London in 2011. Figure 6 shows the proportion each age group held in the total number of working usual residents, and the share they possessed among the same population cycling to work.

Figure 6: The percentage each age group held of the total, all usual residents aged 16 and over in work and all of those cycling to work, London, 2011



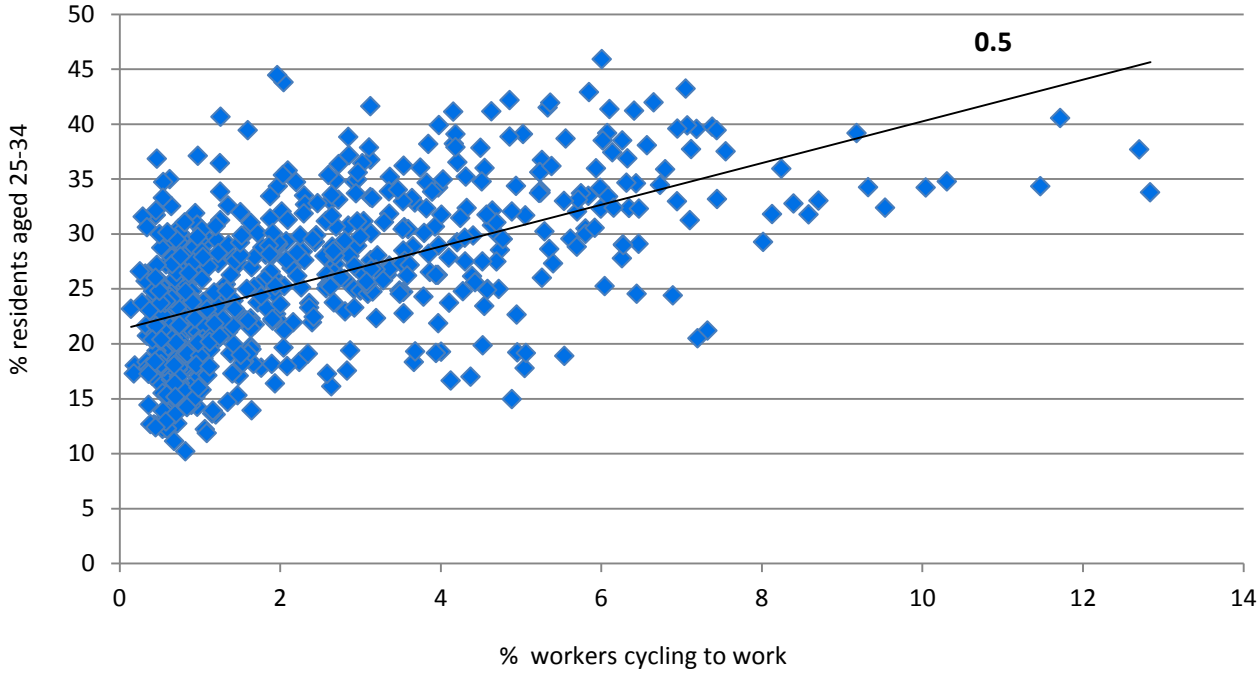
Source: 2011 Census table DC7101EW

Working residents of London aged 25 to 34 were over represented in the number of people using a bicycle to get to work. Over four in ten (64,600) were aged 25 to 34, which was not reflective of the 33 per cent share they held among the working usual residents population. Workers aged 16-24 were less likely than average to cycle, holding a 12 per cent share in the working population however just an eight per cent share in the group cycling to work. Those aged 50 to 64 were also under-represented, with the share held in the total number cycling just two-thirds of the share they held among all workers (12 per cent and 18 per cent).

The scatter graph in Figure 7 below shows the correlation between age group 25 to 34 and cycling to work in London in 2011 by ward[6]. There was a strong positive correlation +0.5, suggesting areas with high shares of working residents aged 25 to 34 also have large proportions of residents cycling to work.

[6] The population base of the data used on all graphs showing correlations in this paper is all working residents aged 16 to 74 years including persons working from home.

Figure 7: The correlation between usual residents aged 25-34 in employment with cycling to work, London wards, 2011

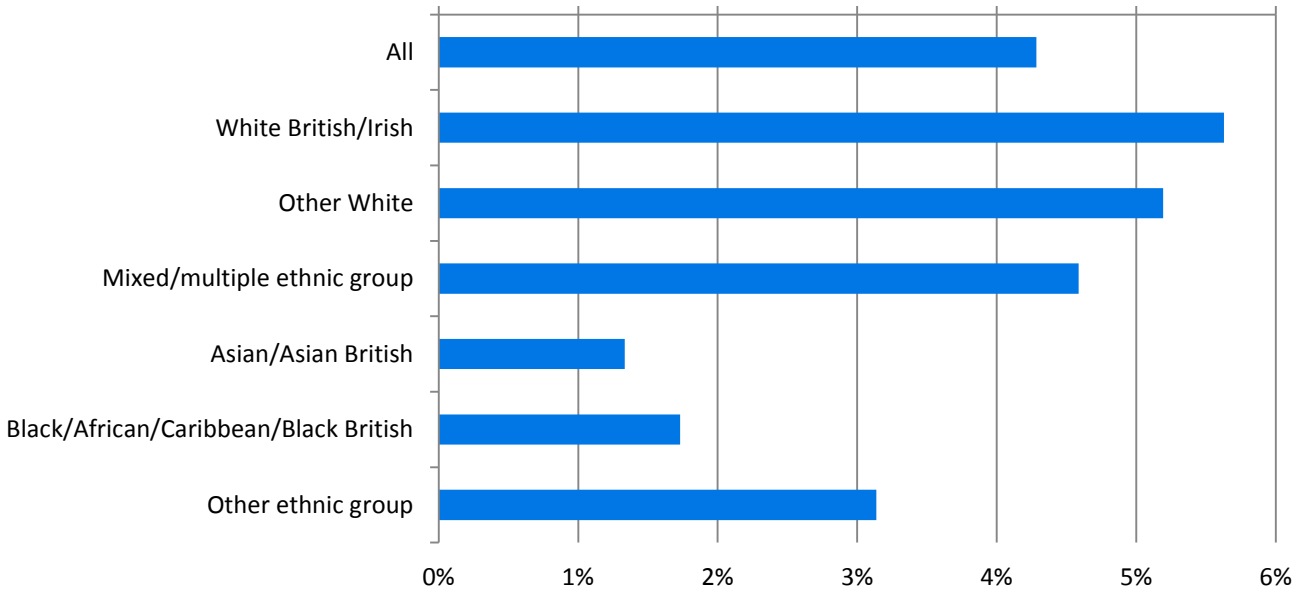


Source: 2011 Census table DC7101EW

Ethnicity

Ethnic origin appeared to have an effect on cycling to work rates in London in 2011. The London average was four per cent, however, the proportion ranged from one to six per cent depending on ethnicity, as shown in Figure 8.

Figure 8: The percentage cycling to work by ethnic group, all usual residents in work aged 16 and over, London, 2011



Source: 2011 Census table DC7201EW

Of all ethnic groups, the propensity for cycling was highest among White British/Irish residents. There were 1.8 million working residents of this ethnicity in London and of these, six per cent (101,400) cycled to work; two percentage points higher than the average for London. Residents of Other White and Mixed also had above average rates at five per cent for each (rounded to 0 decimal places).

Asian residents were a quarter less likely than their White British/Irish counterparts, and a third less than average to cycle to work, with just one per cent of the total cycling. The group with the the next lowest proportion was Black/Black British. Two per cent of workers in this ethnic group rode a bicycle to work compared to the London average of four per cent.

There was a strong positive correlation of +0.4 between residents of Mixed ethnicity in London and cycling to work, as shown in Figure 9. This indicates that areas with high proportions of residents of this ethnic group also have high proportions of people cycling to work. A strong positive correlation was also apparent between Other White residents and cycling to work, of +0.4. Unfortunately, due to the high proportions of residents of White British/Irish ethnicity in most wards in London, the possibility of identifying a strong correlation between these ethnic groups and cycling to work was limited. The small proportions of other ethnic groups found in the majority of London wards makes strong correlations between those and cycling to work much easier to detect.

Figure 9: The correlation between residents of Mixed ethnicity and cycling to work, London wards, 2011

Source: 2011 Census table DC2101EW

Distance travelled to work

Overview

The 2011 Census asked respondents for the address of their main place of work and home, and from this their distance travelled to work was estimated. This was done by calculating a straight line distance between the two locations rather than taking into account the actual journey. Table 3 shows the numbers and proportions of all working residents aged 16 and over travelling to work in London in 2011 by distance, and the same for the population of residents cycling to work. The majority of workers in London travelled between 2km>20km.

Table 3: Distance travelled to work, all usual residents aged 16 and over travelling to work and all usual residents aged 16 and over cycling to work, London, 2011

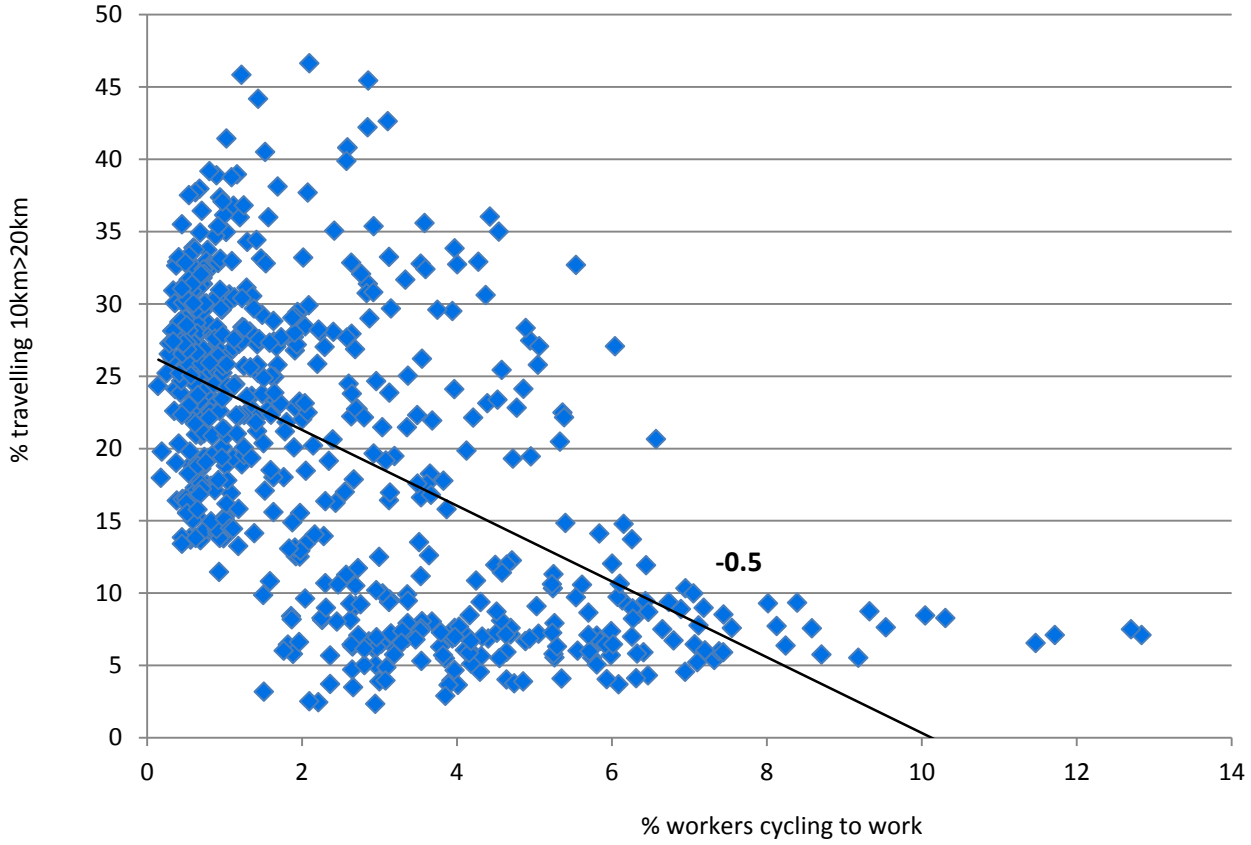
Distance travelled	All usual residents 16+ travelling to work		All usual residents 16+ cycling to work	
	Number	Percentage	Number	Percentage
Total	**3,634,300**	**100%**	**155,700**	**100%**
< 2km	477,500	**13%**	20,900	**13%**
2km > 5km	719,500	**20%**	49,500	**32%**
5km > 10km	930,100	**26%**	52,800	**34%**
10km > 20km	798,600	**22%**	17,600	**11%**
20km+	274,200	**8%**	2,700	**2%**
Other	434,500	**12%**	12,2000	**8%**

Source: 2011 Census table DC7701EW
'Other' distance travelled includes no fixed place of work, working on an offshore installation and working outside of the UK.

There were 155,700 residents that cycled to work in London in 2011. As to be expected, these workers were more likely to travel shorter distances to work than all London workers. Proportions travelling >2km was the same, however, the cycling population had a much higher share of residents travelling 2km>5km and 5km>10km than the total working population. Two thirds of all residents cycling to work travelled 2km>10km; this proportion was under half for all workers.

There were strong correlations between certain distance groups and cycling to work in London in 2011. Distance sub-categories 2km>5km and 5km>10km both had positive correlations with cycling to work of 0.4, suggesting that areas with high proportions of workers with a distance travelled to work within either one of these sub-groups were likely to have high proportions of workers using a bicycle to get to work. Conversely, groups 10km>20km, and 20km+ both had strong negative correlations with cycling to work (of -0.5 and -0.4), suggesting where there were high proportions of workers travelling these distances, there were are low proportions of people using a bicycle to travel to work. Figure 10 shows the correlation between travelling 10km>20km and cycling to work.

Figure 10: The correlation between travelling 10km>20km to work and cycling to work, all usual residents aged 16 and over in work, London wards, 2011



Source: 2011 Census table QS702EW

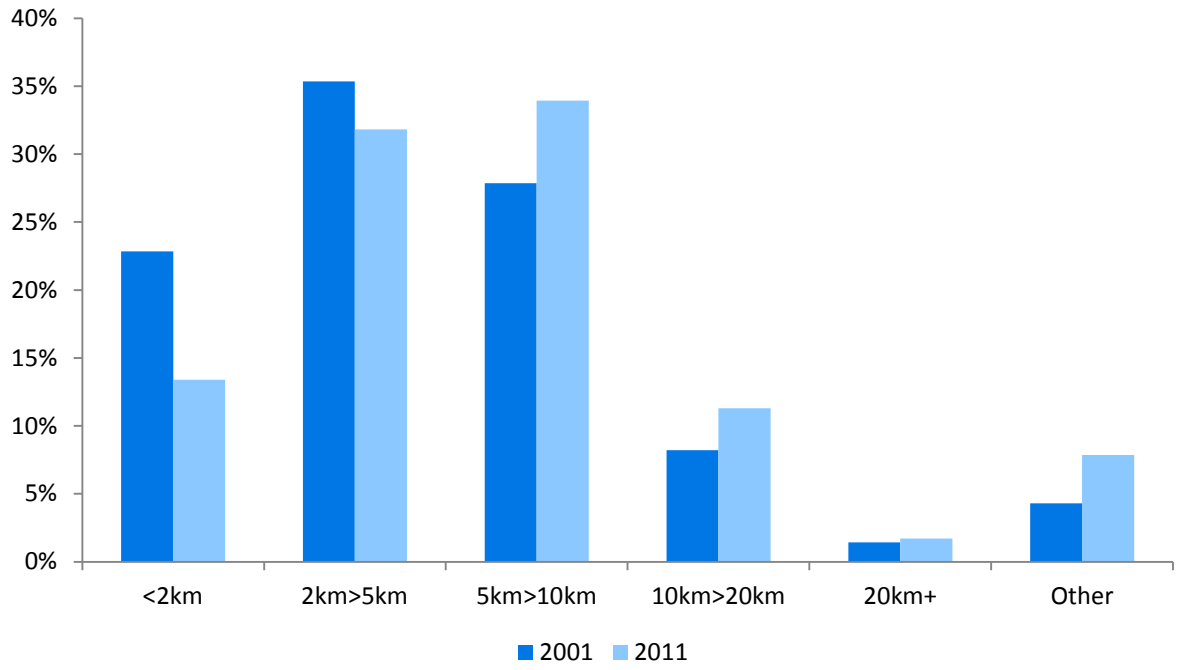
Intercensal comparisons

There have been some notable changes over the intercensal period to the distances people cycled to work, as shown in Figure 11. In 2001, those cycling to work were much more likely to travel shorter distances than those cycling in 2011. In London in 2011, of all usual residents cycling to work, 23 per cent travelled <2km; however in 2011 this figure was ten percentage points less at 13 per cent. Those travelling 2km<5km held a share three percentage points higher in 2001 (35 per cent) than in 2011 (32 per cent). A higher proportion of residents cycled 10km or more to work in 2011 when compared to 2001.

It is worth noting here that the proportion of residents cycling to work that were in the 'Other'[7] distance category had doubled over the intercensal period, from four per cent in 2001 to eight per cent in 2011. However, this also increased in the same proportions within all usual residents in work, from six per cent in 2001 to eleven per cent in 2011[8], implying there was no causal link between cycling and the 'Other' sub-group.

[7] Those travelling 'other' distances includes no fixed place of work, working on an offshore installation and working outside of the UK.
[8] Figures from 2011 Census table QS701EW and 2001 Census table UV035, based on all usual residents aged 16 to 74 in employment.

Figure 11: The percentage of all those cycling to work in each distance travelled category, London wards, 2001 and 2011

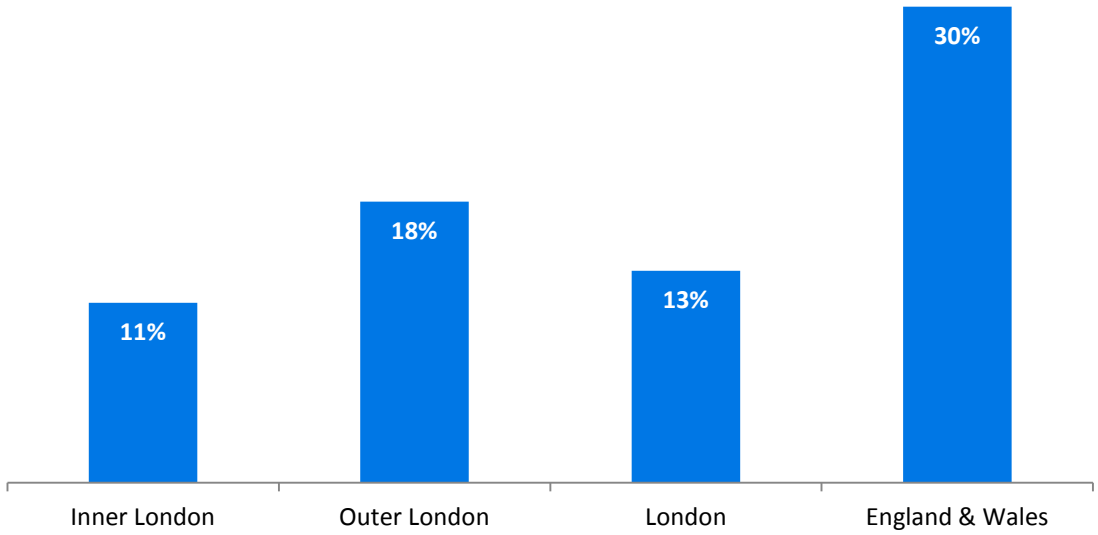


Source: 2001 Census table ST121 and 2011 Census table DC7701EW

Area comparisons

Londoners cycling to work were much more likely to travel longer distances than those living in England & Wales in 2011. The proportion of Londoners cycling <2km was half that of England & Wales. Residents in outer London cycling to work were more likely to travel <2km to work than those living in inner London.

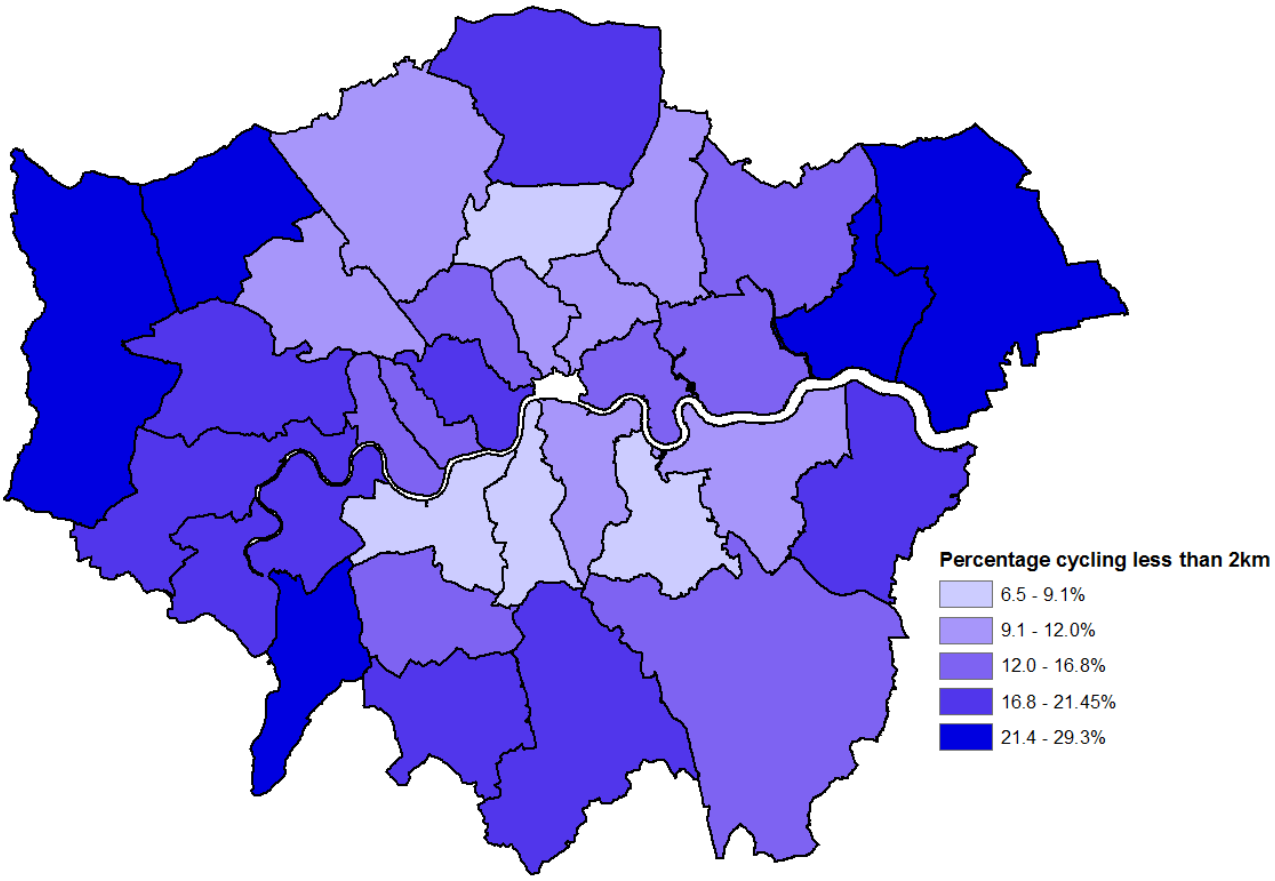
Figure 12: The percentage of those cycling to work travelling <2km by area, 2011



Source: 2011 Census table DC7701EW

The map in Figure 13 shows the percentage of all cyclists that travelled <2km to work by borough in 2011. The boroughs with the highest proportions were the outer boroughs of Hillingdon, Havering and Kingston upon Thames. Of all residents cycling to work in Hillingdon, 29 per cent cycled <2km. This proportion was 26 per cent for Havering, and 25 per cent for Kingston upon Thames. The inner boroughs of Lambeth, Wandsworth, Lewisham, and Haringey all had shares of less than ten per cent.

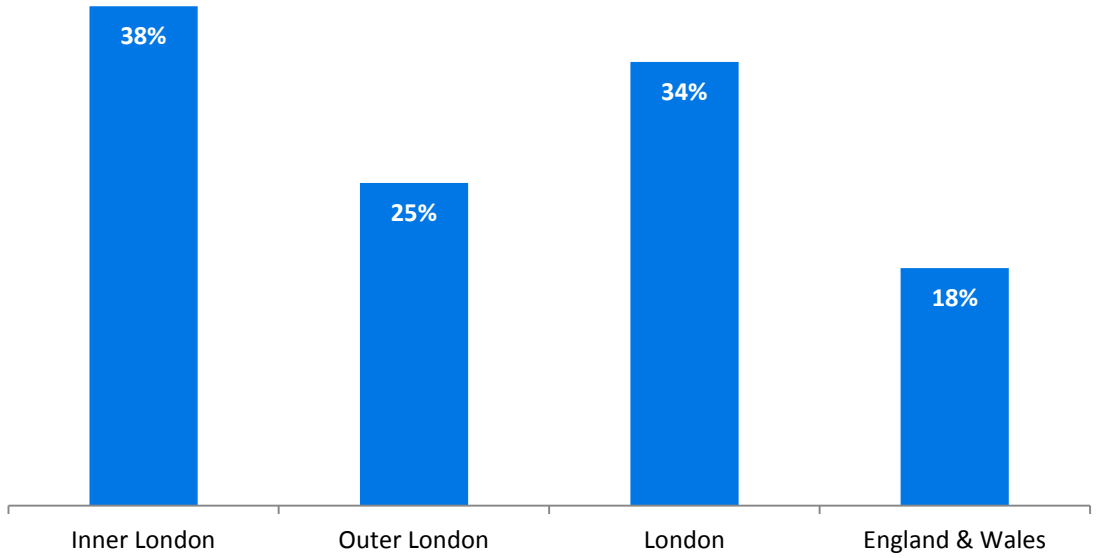
Figure 13: The percentage of all usual residents aged 16 and over cycling to work travelling <2km, borough-level, London, 2011



Source: 2011 Census table DC7701EW
Please note that data for the City of London was missing from the table due to this data being disclosive.

The most common distance travelled by Londoners cycling to work was 5km>10km, with over one third (52,800) cycling this distance, as shown in Figure 14. This was not the case for residents of England & Wales cycling to work, who held a share half that for London. Londoners living in the inner part of the capital were much more likely to have a home-to-work journey of between 5km>10km than their outer London counterparts. Residents of England & Wales cycling to work were over twice as likely to cycle 20km+ than their counterparts in London, as were outer London residents in comparison with those in inner London.

Figure 14: The percentage of those cycling to work travelling 5km>10km by area, 2011



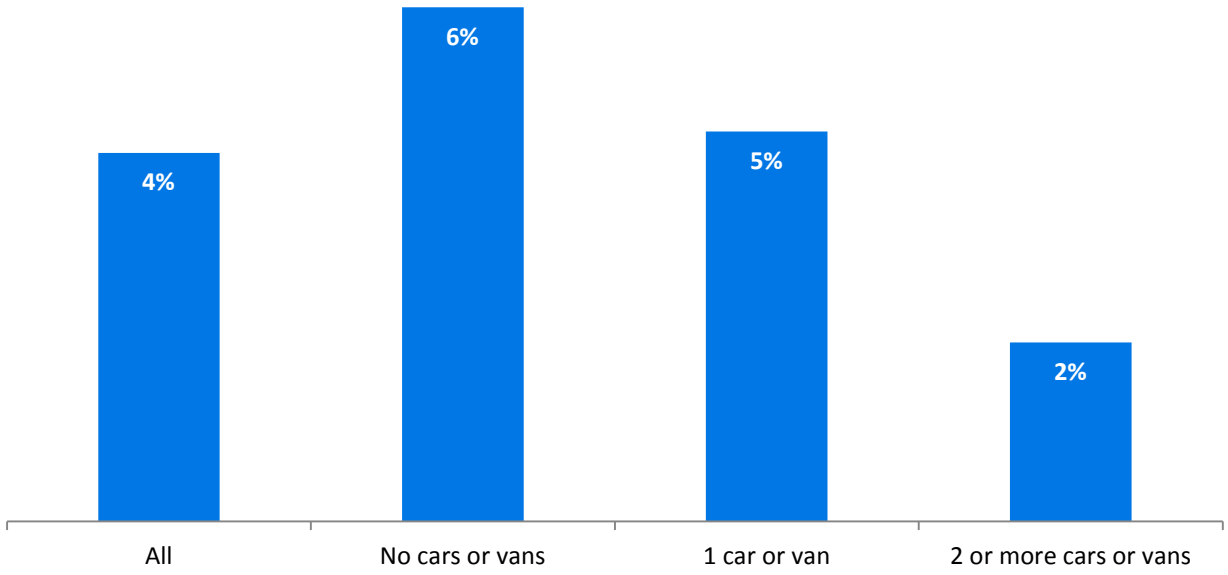
Source: 2011 Census table DC7701EW

Car or van availability

In London in 2011, 31 per cent (1.12 million) workers lived in a household with no car or van. 41 per cent (1.47 million) had one car or van in their household, and 28 per cent (1.02 million) had two or more.

There were notable differences between these groups in the proportion cycling to work, as shown in Figure 15. London workers with no cars or vans in their household were much more likely to cycle to work than those with two or more. Those with no cars or vans were three times more likely to cycle to work than those with two or more cars or vans (six per cent and two per cent respectively). However, residents with one car or van were almost just as likely as those with none to cycle to work, at five per cent.

Figure 15: The percentage of those cycling to work by car or van availability, London, 2011



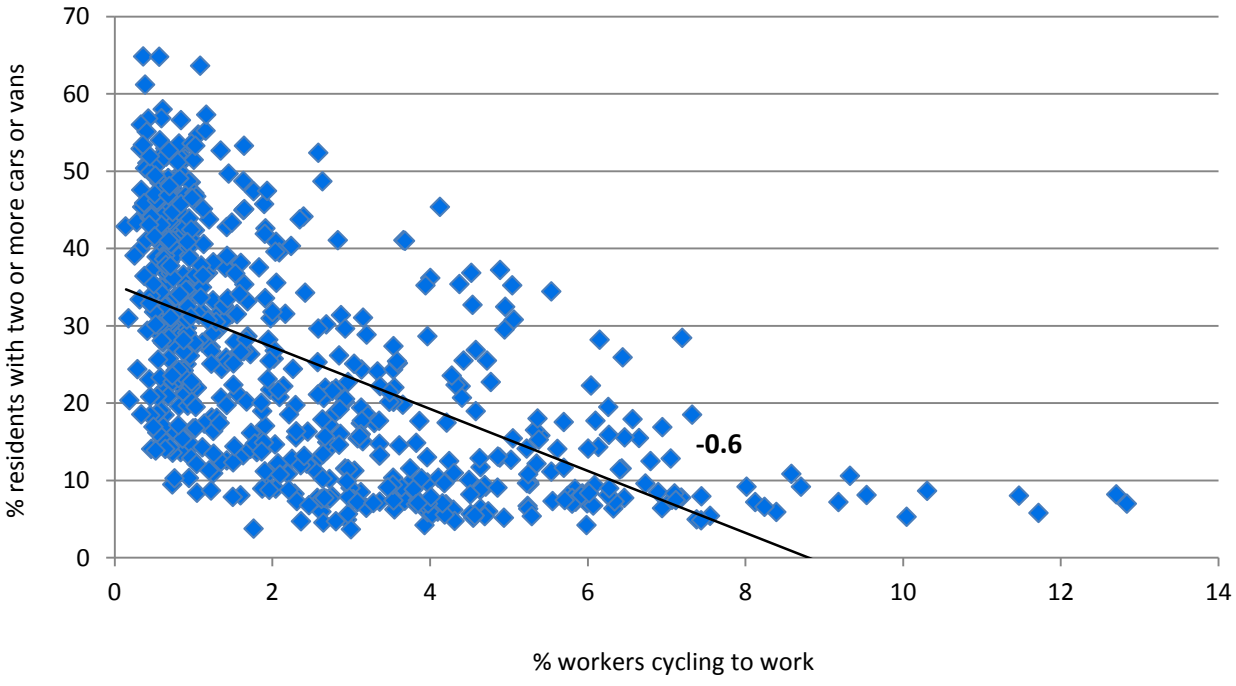
Source: 2011 Census table DC7401EW

There was a strong positive correlation between residents with no cars or vans and those cycling to work of +0.6, suggesting areas with high shares of working residents with no car or van in the household had high shares of residents using a bicycle to get to work. Areas with high proportions of residents with two or more cars or vans in their households tended to have low proportions of residents cycling to work, with a negative correlation between the two of -0.6. Figures 16 and 17 show these two correlations.

Figure 16: The correlation between having no cars or vans in the household and cycling to work, all usual residents aged 16-74 in households, London wards, 2011

Source: 2011 Census table DC7401EW

Figure 17: The correlation between having 2 or more cars or vans in the household and cycling to work, all usual residents aged 16-74 in households, London wards, 2011



Source: 2011 Census table DC7401EW

Skills and the Labour Market

The next section analyses the relationships between skills and the labour market, and the likelihood of cycling to work.

Highest qualification

The 2011 Census asked people aged 16 and over for their highest qualification level, and for this there were seven categories, as follows:

- No qualifications
- Level 1 (GCSE grade D-G)
- Level 2 (GCSE grade A*-C)
- Apprenticeship
- Level 3 (A-Level)
- Level 4 and above (certificate of higher education and above)
- Other. Other qualifications are those which cannot be placed into the Qualifications and Credit Framework (QCF)[9].

Table 4 shows the percentage of all working residents aged 16 and over in each highest qualification level category, and the percentage of all those cycling to work in each category. The share each qualification group held in the two population sets were notably different from each other; the higher the qualification level held, the more likely it was that the person cycled to work. Almost one in seven Londoners cycling to work in 2011 had level 4 and above qualifications. Residents with all other qualification levels held shares among the cycling population of less than ten per cent.

Consideration should be paid to the difference between the proportion of all residents holding each qualification type and all residents cycling to work holding each qualification type. The proportions of all London workers holding no or low-level qualifications was double the share of all cycling residents holding low or no qualifications, showing these residents were under represented among the cycling population. On the contrary, those holding level four and above qualifications held a share among the cycling population 20 percentage points larger than their share among all workers.

[9] These are often non-UK qualifications for which there is no agreed upon comparative level. As a result, qualifications of different types and levels are included in this category.

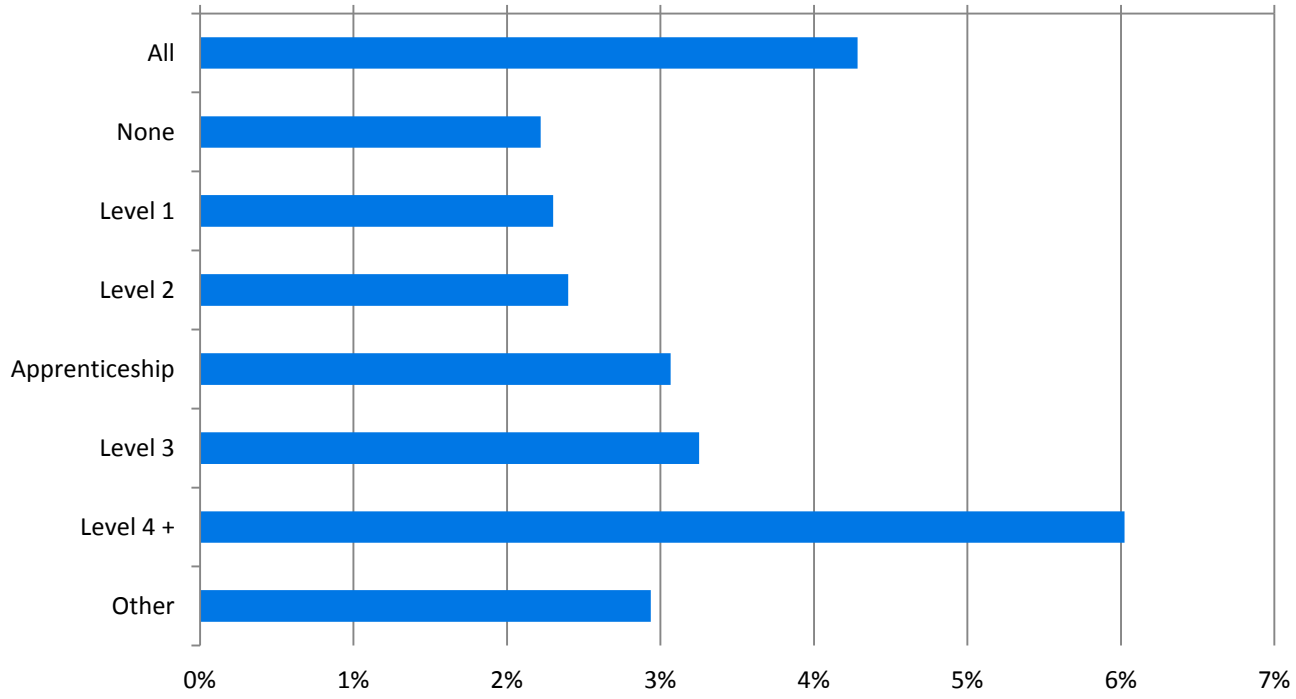
Table 4: Highest qualification held, all usual working residents aged 16 and over and all usual working residents aged 16 and over cycling to work, London, 2011

Highest level of qualification	All usual residents working		All usual residents cycling to work	
	Number	Percentage	Number	Percentage
All	**3,634,300**	**100%**	**155,700**	**100%**
None	291,500	8%	6,500	4%
Level 1	363,700	10%	8,400	5%
Level 2	409,400	11%	9,800	6%
Apprenticeship	59,400	2%	1,800	1%
Level 3	394,300	11%	12,800	8%
Level 4 +	1,758,100	48%	105,900	68%
Other	357,800	10%	10,500	7%

Source: 2011 Census table DC7501EW

Figure 18 shows the percentage of working residents in each qualification group using a bicycle to get to work. This supports the findings above; the higher the qualification level held by the working resident, the more likely they were to cycle to work. The London average was four per cent of all residents, however, for those holding no or level 1 or 2 qualifications, their share was just half this at two per cent for each. Conversely, six per cent of all usual residents holding level 4 and above qualifications in work cycled to work; two percentage points higher than average.

Figure 18: The percentage of all usual residents aged 16 and over in work cycling to work by highest qualification level held, London, 2011

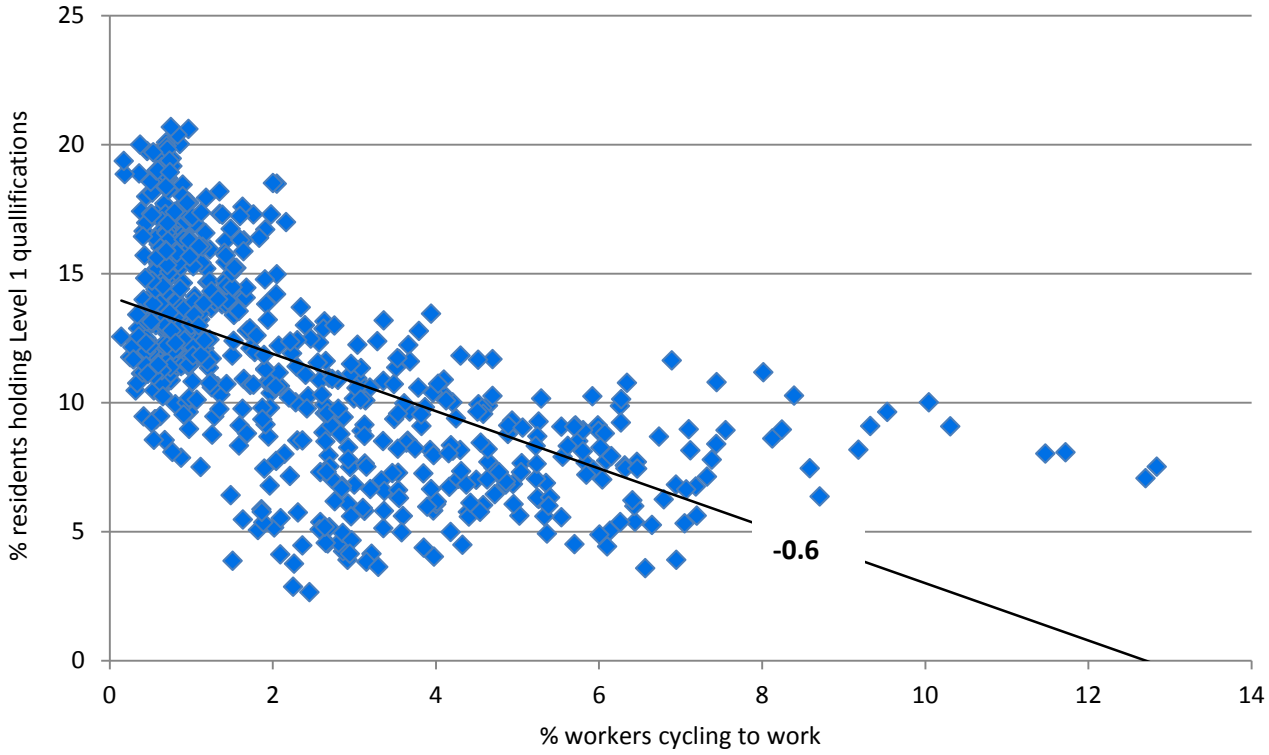


Source: 2011 Census table DC7501EW

There were strong correlations between some qualification-level groups and cycling to work. The strong negative correlations were among the lower-end qualification levels. Levels 1 and 2 both had strong negative corrections of -0.6 each, suggesting that areas where there were high proportions of working residents with these low-level qualifications also had low shares of residents cycling to work. Figure 19 shows the negative correlation between Level 1 qualifications and residents cycling to work.

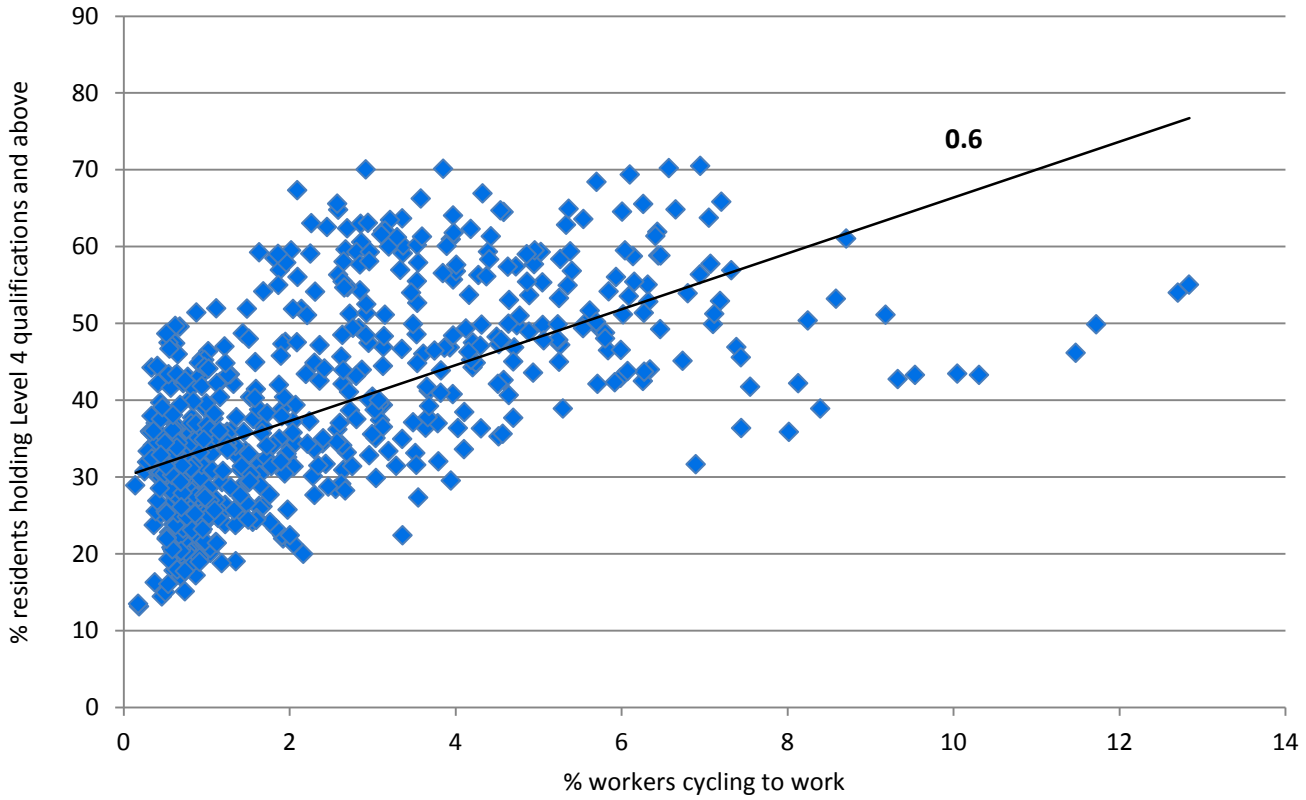
The opposite was true of those holding level 4 and above qualifications and cycling to work. The correlation between these two variables was a strong positive correlation of +0.6, as shown in Figure 20, implying areas with high proportions of residents holding these qualifications also have high shares of residents cycling to work. This is supported by the data above showing residents holding these qualifications were more likely to cycle to work than the average and any other qualification group.

Figure 19: The correlation between holding Level 1 qualifications as the highest and cycling to work, all usual resident aged 16 to 74, London wards, 2011



2011 Census table DC7502EW

Figure 20: The correlation between holding Level 4 and above qualifications as the highest and cycling to work, all usual resident aged 16 to 74, London wards, 2011

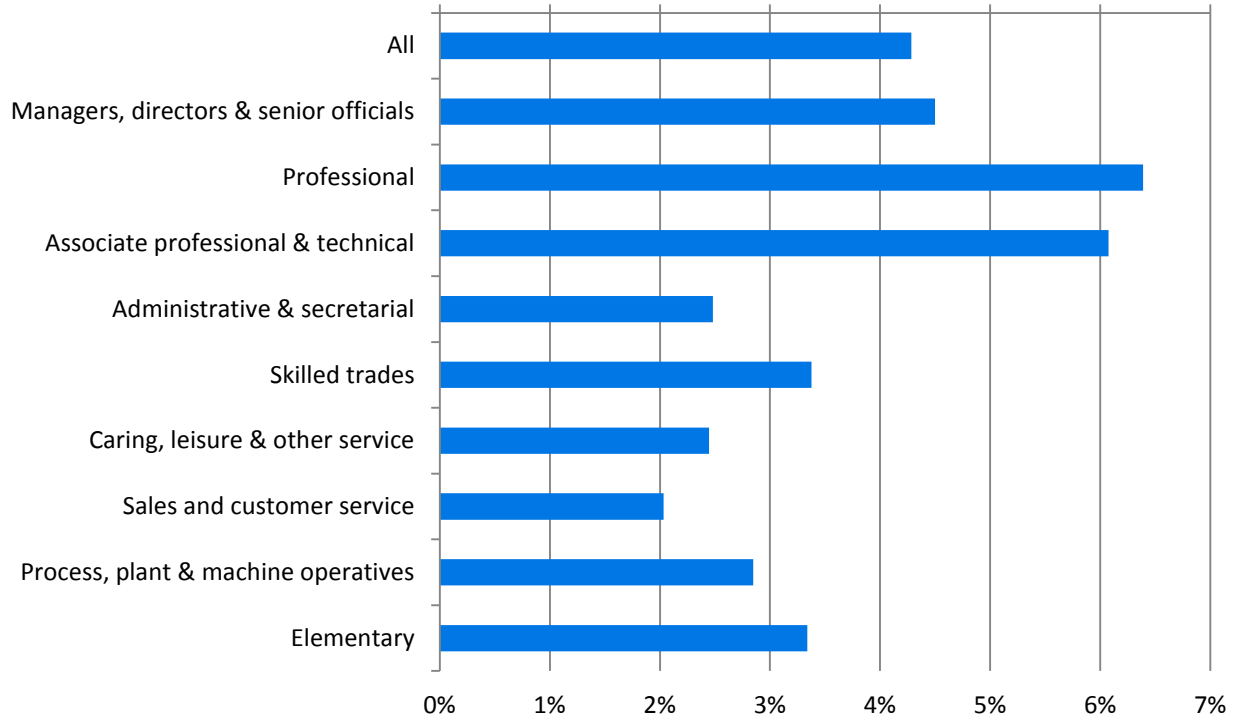


2011 Census table DC7502EW

Occupation

ONS provide data on occupation cross-tabulated with method of travel to work from the 2011 Census. Data used in this analysis has a population base of all usual residents aged 16 and over in employment. Residents who work mainly at or from home have been removed from the analysis. The London average proportion of all working residents cycling to work was four per cent in 2011. There was some variation to this average across occupation types, as shown in Figure 21.

Figure 21: The percentage of all usual residents aged 16 and over cycling to work by occupation, London, 2011



Source: 2011 Census table DC7603EW

Those in 'Professional' and 'Associate professional & technical' occupations were more likely to use a bicycle to get to work than any other occupation type, with shares of six per cent for both. Residents in all occupation types lower than 'Associate professional & technical' had below average shares of workers cycling to work, at between two and three per cent. Those working in 'Administrative & secretarial', 'Caring, leisure and other services' and 'Sales and customer service' occupations all had shares cycling to work much smaller than the average for London, and a just a third of the size of the shares 'Professional' and 'Associate professional & technical' occupations held.

Table 5 shows the distribution of the working population among the nine occupational groups and compares it to the distribution of the population that cycle to work. This shows that the trends described above are not a result of an unevenly distributed population. Although 'Professional' occupations and 'Associate professional and technical' occupations are the largest occupation groups in London (27 per cent and 16 per cent), the proportion in these groups cycling to work were even larger. This reinforces the idea that people working in higher professions were more likely to cycle.

Table 5: Occupation, all usual residents aged 16 and over and all usual residents aged 16 and over cycling to work, London, 2011

Occupation	Percentage of total usual residents aged 16 and over	Percentage of total usual residents aged 16 and over cycling to work
Managers, directors and senior officials	11%	12%
Professional	22%	34%
Associate professional and technical	16%	22%
Administrative and secretarial	12%	7%
Skilled trades	8%	6%
Caring, leisure and other service	8%	4%
Sales and customer service	8%	4%
Process, plant and machine operatives	5%	3%
Elementary	10%	8%

Source: 2011 Census table DC7603EW

These findings are further supported by analysis of correlations between occupation groups and cycling. Most notable was the very strong positive correlation of 0.7between 'Associate professional and technical' occupations and cycling to work. This suggests areas with high proportions of residents cycling to work also have high shares of residents in these occupation types.

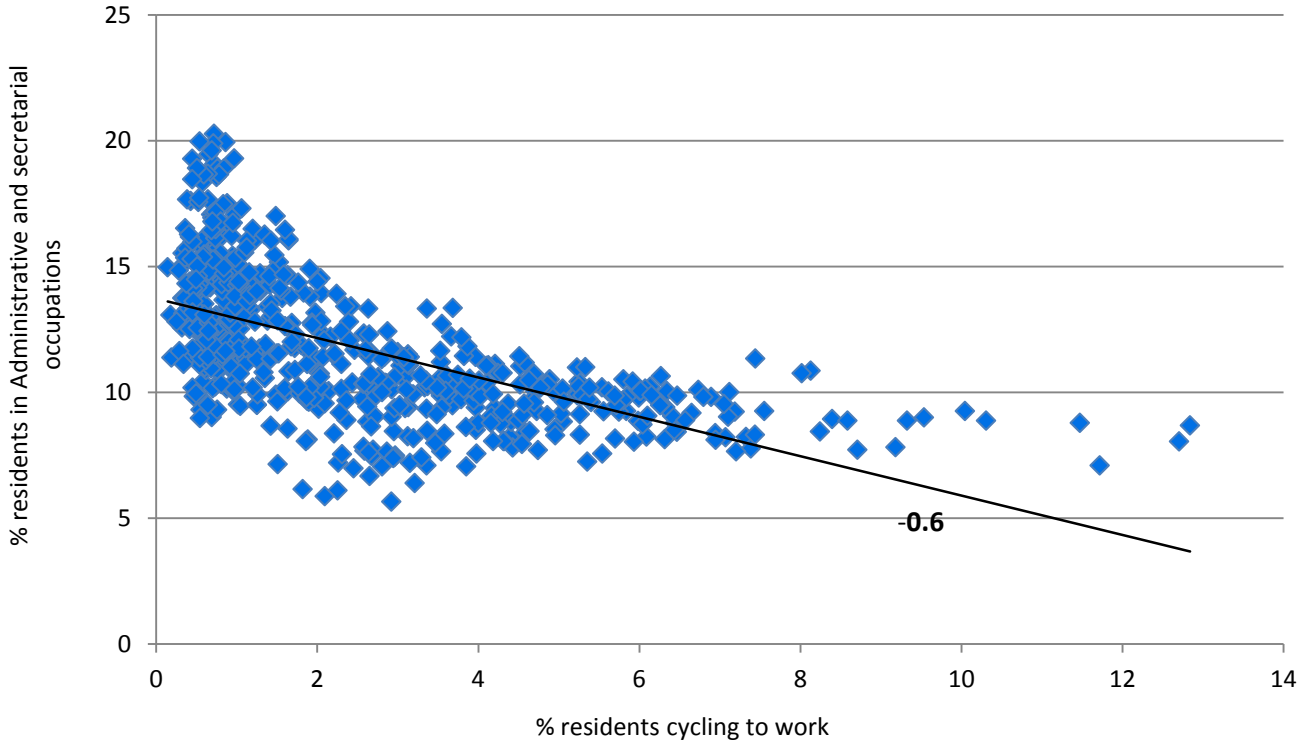
Figure 22: The correlation between Associate professional and technical occupations and cycling to work, all usual resident aged 16 to 74, London wards, 2011

Source: 2011 Census table KS608EW

'Managers, directors and senior officials' had a weak positive correlation with cycling to work of +0.2. All other occupation types were negatively correlated with cycling to work. Those with the strongest negative correlations were 'Administrative and secretarial', 'Skilled trades' and 'Process, plant and machine operative' occupations, all with a negative correlation with cycling to work of -0.6.

This suggests that areas with high proportions of residents in these occupations tended to have low shares cycling to work, and supports the finding that fewer residents in these job-types were cycling to work than average.

Figure 23: The correlation between Administrative and secretarial occupations and cycling to work, all usual resident aged 16 to 74, London wards, 2011



Source: 2011 Census table KS608EW

Industry

The 2011 Census classified workers by industry type. Table 6 shows the proportion of all workers in each industry cycling to work in London in 2011. Most industry types had shares around the average of four per cent with some notable exceptions. Those in Construction had half the average share of workers cycling to work, at just two per cent. Those working in the Information & communication industry, and in Professional, scientific and technical activities had almost double the average share of workers using a bicycle to get to work, at seven per cent for both.

Table 6: Industry, all usual residents aged 16 and over in work and all usual residents aged 16 and over cycling to work, London, 2011

Industry	All usual residents aged 16 and over in work	All usual residents aged 16 and over cycling to work	Percentage of total cycling to work
All	**3,634,300**	**155,700**	**4%**
A, B, D, E - Agriculture, energy & water	29,000	1,200	**4%**
C - Manufacturing	116,000	4,600	**4%**
F - Construction	232,700	5,200	**2%**
G - Wholesale and retail trade; repair of motor vehicles & motor cycles	487,600	13,600	**3%**
H - Transport & storage	188,700	5,600	**3%**
I - Accommodation & food service activities	234,000	8,300	**4%**
J - Information & communication	233,300	16,000	**7%**
K - Financial & insurance activities	290,900	11,900	**4%**
L - Real estate activities	68,800	2,400	**4%**
M - Professional, scientific & technical activities	371,600	26,200	**7%**
N - Administrative & support service activities	212,600	6,800	**3%**
O - Public administration & defence; compulsory social	194,100	9,100	**5%**
P - Education	360,000	18,000	**5%**
Q - Human health & social work activities	398,200	15,100	**4%**
R, S, T, U - Other	216,100	11,800	**5%**

Source: 2011 Census table DC7602EW

The share of all London working residents in each industry type was largely the same (or within two percentage points) as the proportions they held in the total population cycling to work bar a few exceptions.

The industries where proportions varied considerably from the overall shares are highlighted in dark grey in the table above. Six per cent of residents aged 16 and over in work were working in the Construction industry in London in 2011; however, they only made up half that proportion at three per cent of the total number of people cycling to work.

On the other hand, those working in Information & communication industries held a share four percentage points higher in the cycling to work population than the overall population, at ten per cent compared with six per cent. Likewise, those in Professional, scientific & technical industries were more represented within the total number of residents cycling to work, than the total number of residents overall, 17 per cent and 10 per cent respectively.

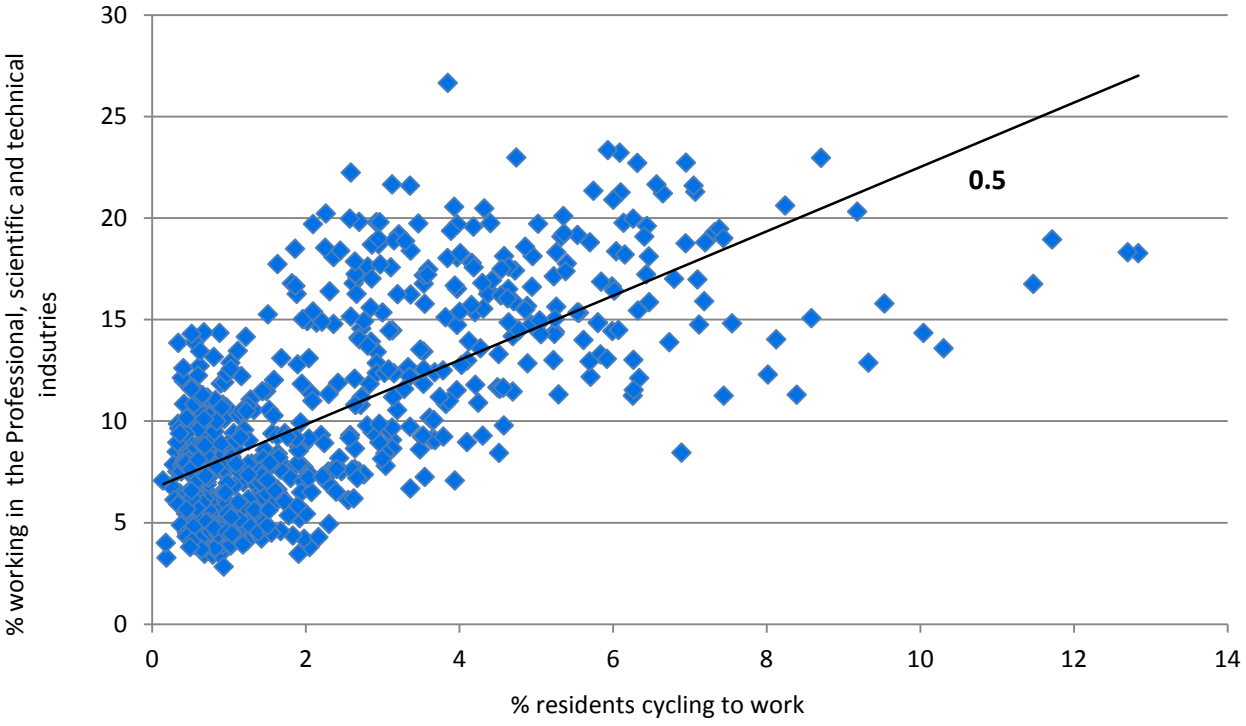
As perhaps is to be expected given the above, the industries most strongly correlated with people cycling to work were Construction, Information & communication, and Professional, scientific & technical. The Construction industry had a strong negative correlation of -0.5 (as shown in Figure 24), suggesting areas where residents in these industries were concentrated had less people cycling to work. On the contrary, areas with high proportions of people in Information & communication, and Professional, scientific & technical industries appear to have higher than average proportions of residents cycling to work, both with

strong positive correlations with cycling to work of +0.5 (Figure 25 shows the correlation between cycling and Professional, scientific and technical occupations).

Figure 24: The correlation between those in the construction industry and cycling to work, all usual residents aged 16 to 74, London wards, 2011

Source: 2011 Census table KS605EW

Figure 25: The correlation between those in Professional, Scientific and technical industries and cycling to work, all usual residents aged 16 to 74, London wards, 2011



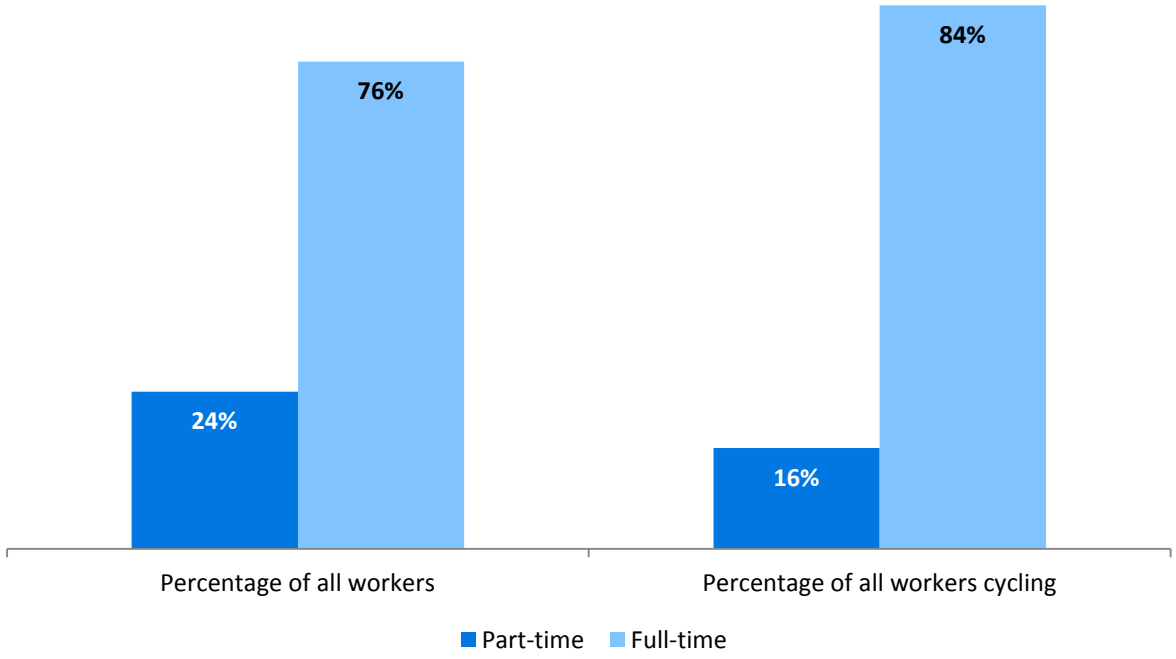
Source: 2011 Census table KS605EW

Hours worked

The 2011 Census asked respondents how many hours they worked in a week; full-time was considered to be 31 hours or more per week, and part-time less than 31 hours. There is more detailed data on hours worked available which breaks down full and part-time further, however this is not available cross-tabulated with method of travel data.

There were 2.75 million usual residents of London working full-time in 2011 and 886,100 working part-time, making up 76 per cent and 24 per cent of the total workers respectively. Interestingly, the cycling population in London were more likely to be full-time workers than the overall population of residents, with 84 per cent working full-time (compared to 76 per cent overall). Of all full-time workers, five per cent cycled to work. This share was just three per cent for all part-timer workers.

Figure 26: Hours worked, all usual residents aged 16 and over in employment, and all usual residents aged 16 and over cycling to work, London, 2011

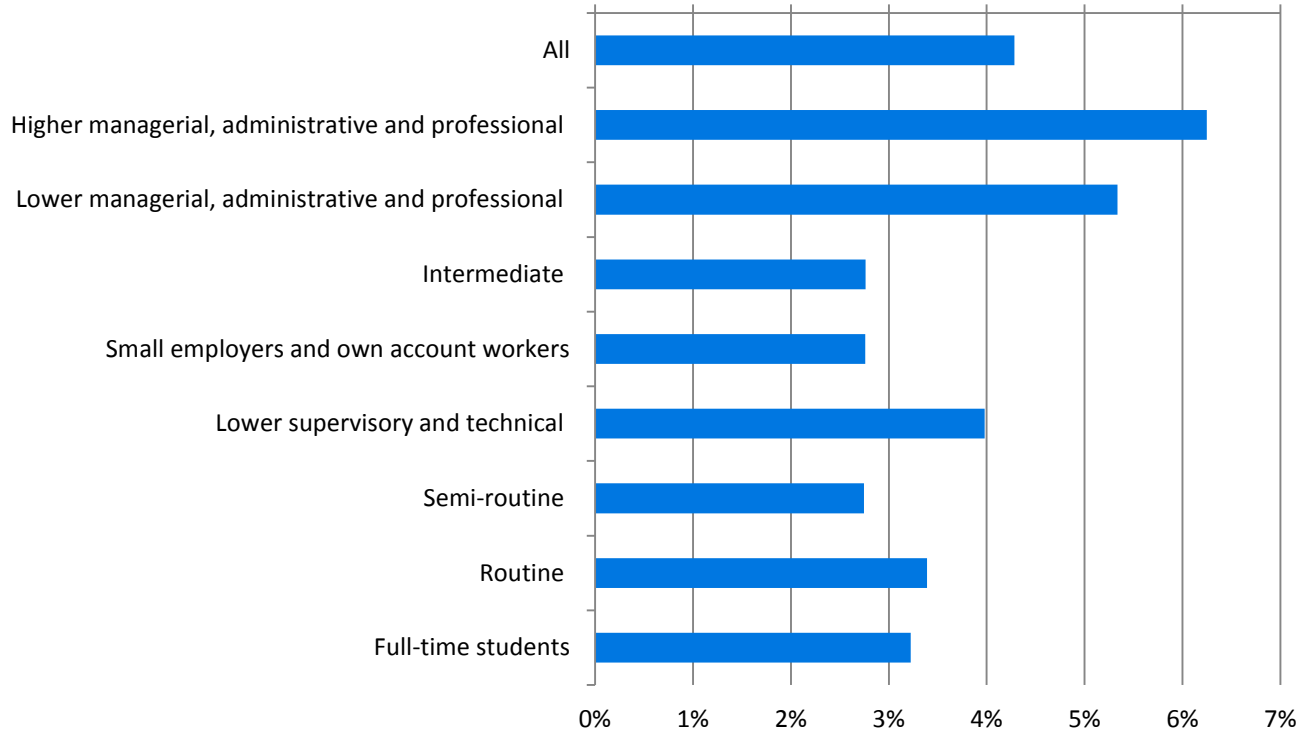


Source: 2011 Census table DC7601EW

NS-SeC

The National Statistics Socio-economic Classification (NS-SeC) combines employment and economic activity data with occupation information to provide a measure of socio-economic group position. The only NS-SeC category that had significantly different proportions of residents cycling to work than average was the Higher managerial, administrative and professional occupations group. Six per cent of all residents in this NS-SeC category cycled to work in London in 2011; two percentage points above average.

Figure 27: The percentage of all usual residents aged 16 and over cycling to work by NS-SeC, London, 2011



Source: 2011 Census table DC7604EW

Despite the majority of categories having around average proportions of workers cycling to work (four per cent), there were notable differences in some categories Those in both 'Higher' and 'Lower managerial, administrative and professional' occupations held higher shares among the population cycling to work in London than they did overall, at 18 per cent compared with 26 per cent and 29 per cent compared with 37 per cent respectively.

The opposite was true of those in Intermediate, Small employers & own account workers and Semi-routine occupations. Workers in these groups held a share among the cycling population that was just two-thirds the size of their overall proportions. This was to be expected, given that the previous analysis on qualifications found that those holding higher qualifications had higher cycling to work rates, and the higher NS-SeC groups tend to require higher qualification levels.

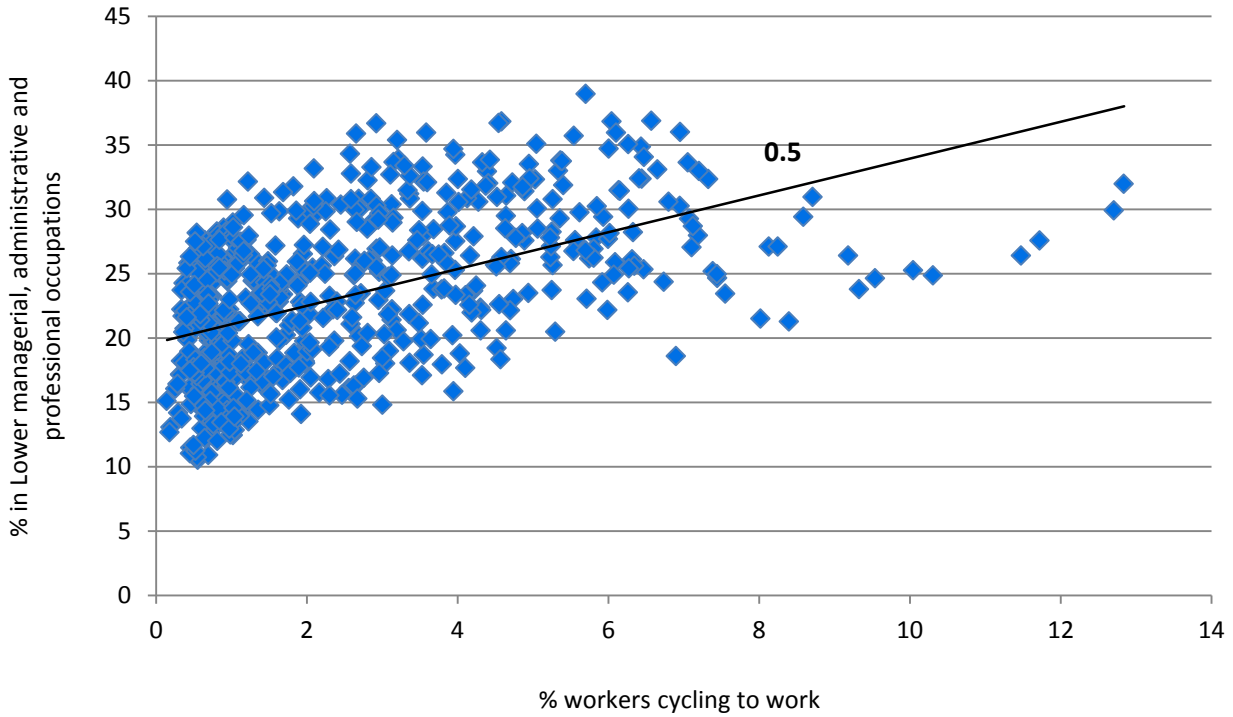
Table 7: NS-Sec, all usual residents aged 16 and over in work, and all usual residents aged 16 and over cycling to work, London, 2011

NS-Sec category	Percentage of all workers	Percentage of all workers cycling
Higher managerial, administrative & professional	18%	26%
Lower managerial, administrative & professional	29%	37%
Intermediate	14%	9%
Small employers & own account workers	9%	6%
Lower supervisory & technical	6%	6%
Semi-routine	11%	7%
Routine	7%	6%
Full-time students	5%	4%

Source: 2011 Census table DC7604EW

These results are further supported by the strong correlations present among these NS-SeC groups and cycling to work. The strongest positive correlation of +0.5 was found between 'Lower managerial, administrative and professional' occupations and cycling to work, as shown in Figure 28. This is indicative of high proportions of those in 'Lower managerial, administrative and professional' occupations in areas of London where there were also high shares of those cycling to work. Areas with high proportions of those in 'Higher managerial, administrative and professional' occupations were also likely to have high proportions of those cycling to work, with a strong positive correlation of +0.4.

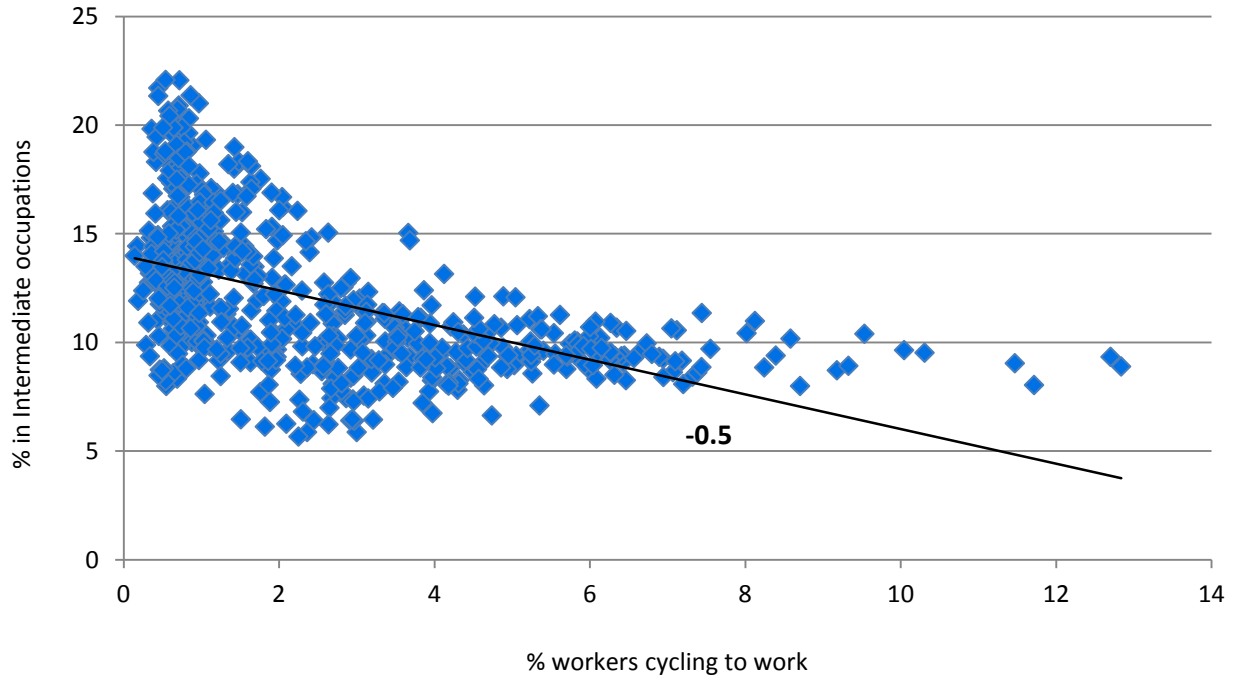
Figure 28: The correlation between Lower managerial, administrative and professional occupations and cycling to work, all usual residents aged 16-74 in work, London wards, 2011



Source: 2011 Census table KS611EW

Those in Intermediate, Small employee and own account worker, and Semi-routine occupations all had a strong negative correlation of -0.5 with cycling to work. Figure 29 shows the correlation between those in Intermediate occupations and cycling to work.

Figure 29: The correlation between Intermediate occupations and cycling to work, all usual residents aged 16-74 in work, London, 2011



Source: 2011 Census table KS611EW

Conclusion

To conclude, there are many factors, both on a personal and geographical level that appear to have an influence on the likelihood of London residents to cycle to work. The rise of over 100 per cent in cycling to work numbers in London over the ten year period is very encouraging. However, pinpointing the causes of this rise is complex and would require in-depth statistical analysis on a range of variables and datasets. This increase in cycling to work has not been seen across London; rates in inner London have almost doubled its rate over the intercensal period, whereas there has been no change in outer London over the time. Is this simply a result of the longer commute residents of outer London are likely to have to work compared with inner London residents, resulting in less outer London residents choosing to cycle, or do the personal characteristics of people likely to be living in outer London have more of an influence?

There were many personal characteristics identified in this report as having some impact on the propensity to cycle to work, with workers who were female, of Black or Asian ethnicities, who had lower qualifications or were in lower-level occupations all having lower cycling to work rates. How these personal characteristics link to one another, and which are impacting more on cycling to work rates than others can be established through further research and analysis. This report has given an overview of cycling to work using the most comprehensive dataset available (the Census). The locations and groups of people which are most and least likely to cycle to work have been identified, providing a base for any further work aiming to identify the key factors influencing cycling to work rates.

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