
# DRAFT REPORT ON THE AGGREGATE RESULTS OF THE (QS1) SURVEY

WP.T2 Deliverable 3.3

ABSTRACT

This summary report presents aggregate survey results of the QS1 questionnaire, targeted at potential users of eHUBS (i.e., shared mobility hubs).

This report has been produced by Newcastle University and TU Delft and features general descriptive analysis as well as comparisons across cities.

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# INTRODUCTION

This report presents the aggregate survey results of the first eHUBS questionnaire (QS1), targeted at the general population and designed to address two main objectives.

The primary objective was to **introduce eHUBS as a novel type of shared mobility**. While conventional monomodal car and bike sharing schemes have existed in Europe for some time, multimodal shared mobility hubs are still a novelty in Europe. Hence, an important consideration was to familiarise survey respondents with the concept of eHUBS.

The second major objective was to **identify potential user groups of eHUBS** in the project partner cities including Arnhem (ARN)/Nijmegen (NIJ), Amsterdam (AMS), Dreux (DRE), Kempten (KEM), Leuven (LEU) and Manchester (MAN). In addition, we wanted to provide a basis for exploring the potential emission savings by people switching to shared (L)EVs.

In total, survey respondents completed several sub-sections as outlined in **Figure 1** below.

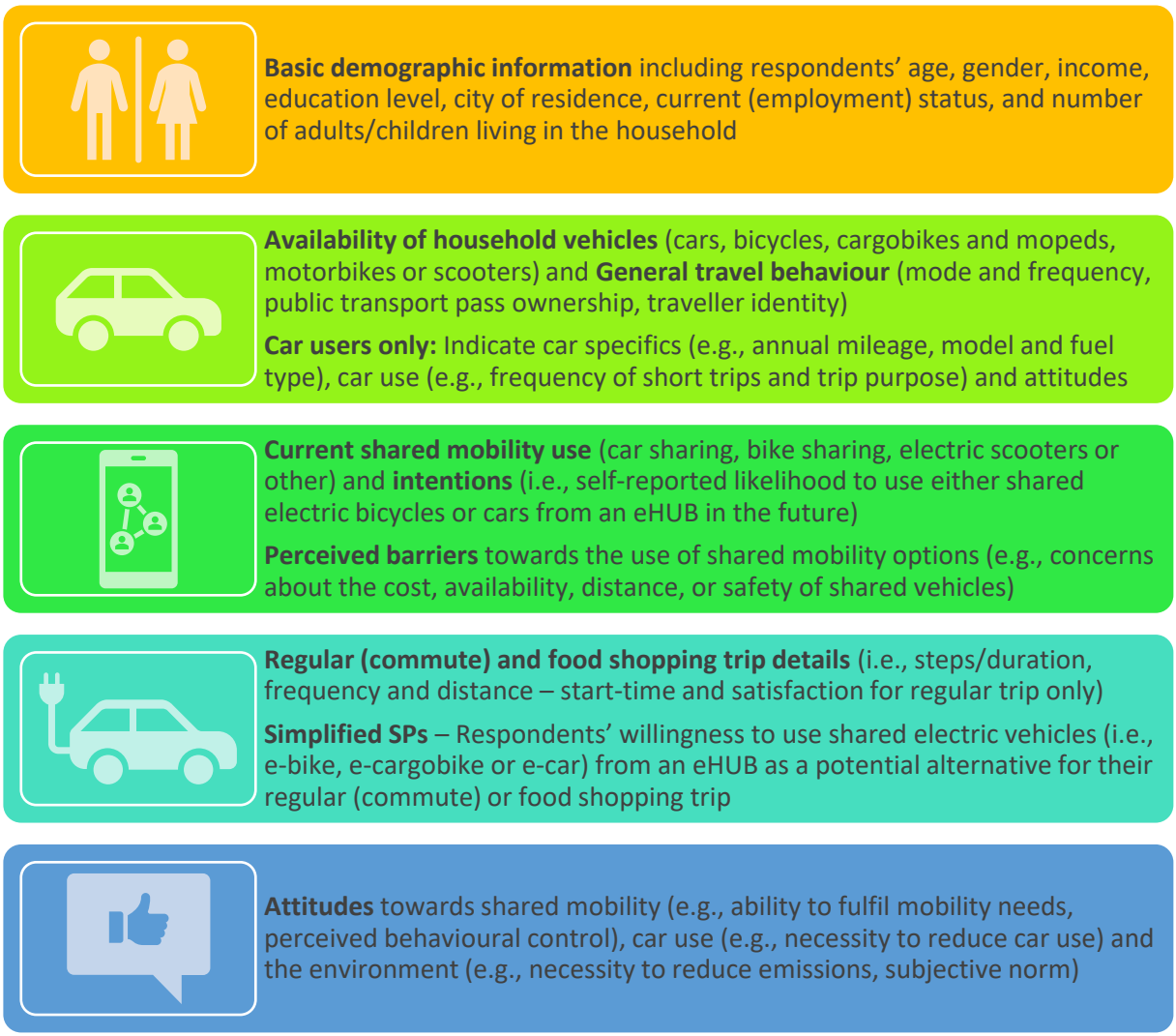


**Figure 1. Questionnaire sub-sections completed by survey respondents**

The survey was created on the online survey platform SurveyMonkey and translated from English into Dutch, German and French, with the aid of city partners where needed.

Cities approached the data collection differently with some cities allocating the data collection to a polling agency (Amsterdam and Manchester) to achieve a representative study sample and other cities using their own distribution channels (e.g., email, social media, or printed flyers) for data collection (Arnhem, Dreux, Kempten and Nijmegen). The City of Leuven used a combination of both data collection approaches.

The diagram below (see **Figure 2**) illustrates the process of data collection for the first multilingual eHUBS questionnaire survey (QS1), from the initial drafting and piloting of the survey in early 2020 to the closure of data collection in late 2020.

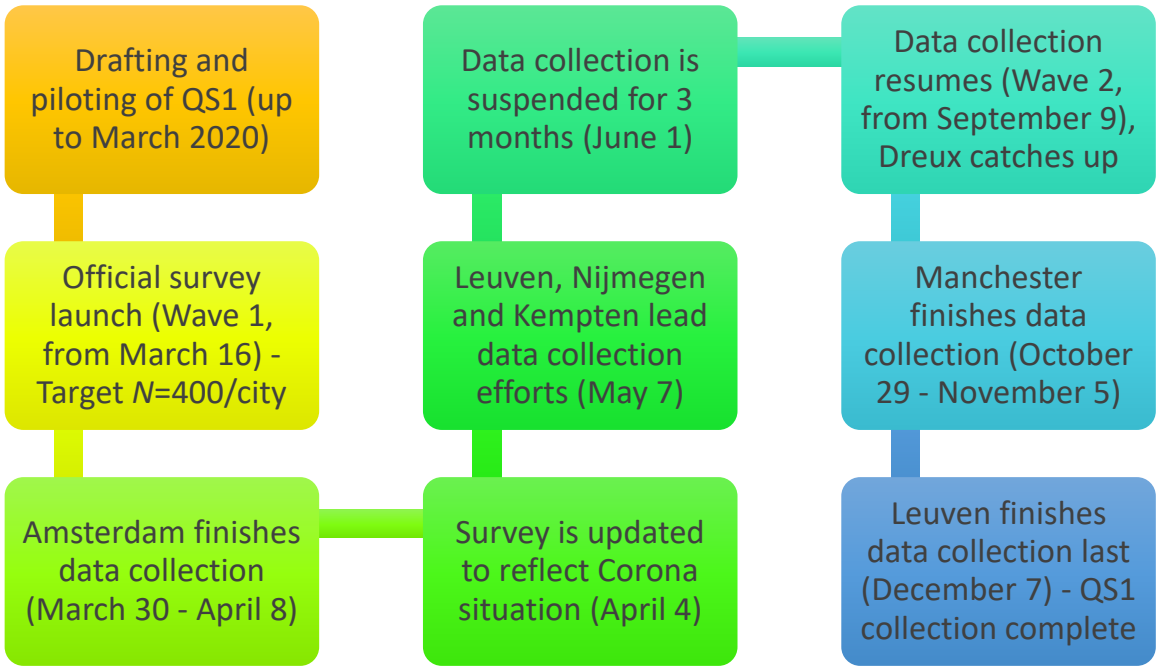


**Figure 2. Process of data collection for the first eHUBS questionnaire from the initial drafting and piloting of the questionnaire to the end of data collection**

First and foremost is the Summary of Aggregate Results, presenting the most important findings and key messages from QS1, aggregated across all eHUBS pilot cities. For a copy of the questionnaire, data requests, thoughts, or suggestions, please contact the administrator responsible for the survey:

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# SUMMARY OF AGGREGATE RESULTS

On this page, the main findings of the first eHUBS questionnaire are summarised.

- The majority of respondents reported possessing a **bicycle** (85%), whereas levels of **car** ownership were generally lower (73%). Few respondents reported possessing a **cargobike** (11%) or **motorbike** (20%). [Section 2]
- Among the car owners, 31% of respondents indicated usually **driving alone**, whereas 69% indicated driving with at least one passenger. Moreover, 42% of car drivers reported using their car for short trips (i.e., < 6 mi/10km) 4 times per week or more.
- **Walking** and **Private Motorised Transport (PMT)** represented the two most common modes for respondents' general travel behaviour, with 70% of respondents walking for transport and 66% using PMT on at least 1-2 days per week [Section 3].
- In terms of **traveller identity**, 38% identified themselves as car drivers, followed by multimodal users (26%) and cyclists (20%). Only a minority of respondents identified themselves as either walkers (8%) or public transport users (8%).
- Most reported not using any **shared mobility** options on a regular basis. Among those who did, car sharing (14%) and bike sharing (10%) were the most popular.
- Respondents expressed varying degrees of **interest in using shared vehicles** from an eHUB [Section 4]. People's interest in shared electric cars was somewhat greater ($M$ = 55.24, $SD$ = 33.7) than their interest in shared e-bikes ($M$ = 51.19, $SD$ = 34.37).
- The most commonly cited **barriers** towards the use of shared vehicles included a preference for using one's own bicycle/car (41%), concerns about the distance of the shared vehicle location (21%), and concerns about the availability of vehicles (20%). Concerns about the cost (17%) and use (16%) of rented vehicles were also common.
- 50% of respondents indicated they would consider using either a shared electric car or shared e-bike from an eHUB for at least a few of their **regular (commute) trips**. The combined use of shared EVs or e-bikes and public transport was less popular, with 66% and 63%, respectively, indicating they would not use it [Section 5].
- 48% of respondents indicated they would consider using either a shared electric car or shared e-cargobike (46%) from an eHUB for at least a few **food shopping trips**. The combined use of shared EVs or e-cargobikes and public transport was the least popular, with 76% and 77%, respectively, indicating they would not use it [Section 6].
- In general, respondents held **positive attitudes** towards eHUBS and shared mobility with the majority indicating that they would enjoy trying out vehicles from an eHUB (60%), would be interested in using shared vehicles for work (44%) or non-work trips (60%), and that eHUBS provide them with more flexibility (45%). [Section 7]

In the following sections of the report, aggregate (i.e., across partner cities and other interested parties) descriptive statistics are presented for the aforementioned survey sub-sections. For proportions, all results are presented in the same format – that is, first the sample *N*, followed by the percentage of the total, as follows: **(*N = [count]*, %)**. Hereby,

$\mathcal{N}$ represents the total number of survey respondents ($\mathcal{N}$ = 2493)

*N* represents the total number of responses to a specific question

*n* represents the sample of N that has a particular characteristic

Please note that, throughout the report, analytics are based on the total number of survey respondents of $\mathcal{N}$ = 2493, unless indicated otherwise. Minor deviations from this value are due to missing survey responses, whereas larger deviations are due to the skip logic of the survey (e.g., non-car users were not shown questions related to car use).

Where appropriate, comparisons between respondents are drawn based on their reported **City of residence** – that is, in order of contribution to the total sample size,

- Amsterdam (AMS, *N* = 466, 19%)
- Leuven (LEU, *N* = 405, 16.5%)
- Manchester (MAN, *N* = 368, 15%)
- Kempten (KEM, *N* = 303, 12%)
- Dreux (DRE, *N* = 255, 10.5%) and
- Arnhem / Nijmegen (ARN, *N* = 50, 2% / NIJ, *N* = 217, 9%)[1]

Except for the demographic part of the survey, these comparisons – excluding responses from 'Other' (non-partner) cities (*N* = 414, 16%) – are generally provided in the Appendix.

With few exceptions, this descriptive report contains no advanced statistical analyses. These will be disseminated separately in academic research publications, copies of which will be made available to consortia members. Where statistical tests have been calculated, relevant information is provided in footnotes.

***Confidence intervals (CIs)*** – 95% CIs for mean estimates are reported in Section 4 of the report. A 95% confidence level means that we would expect 95% of the interval estimates to include the population parameter. Confidence intervals can be compared across groups. If the latter do not overlap, this indicates a statistically significant difference at $\alpha = .05$.

[1] Arnhem and Nijmegen are considered to be the same city/region throughout the entire report.

# 1. DEMOGRAPHIC PROFILE

In this section, respondents' demographic profile is explored. **Figure 3** shows survey completions by country (outer circle) and city of residence (inner circle).

The largest proportion of survey respondents came from the Netherlands (yellow; *n* = 761, 31%), with roughly equal proportions of respondents from the remaining project partner countries (between 16% to 19% of the sample).

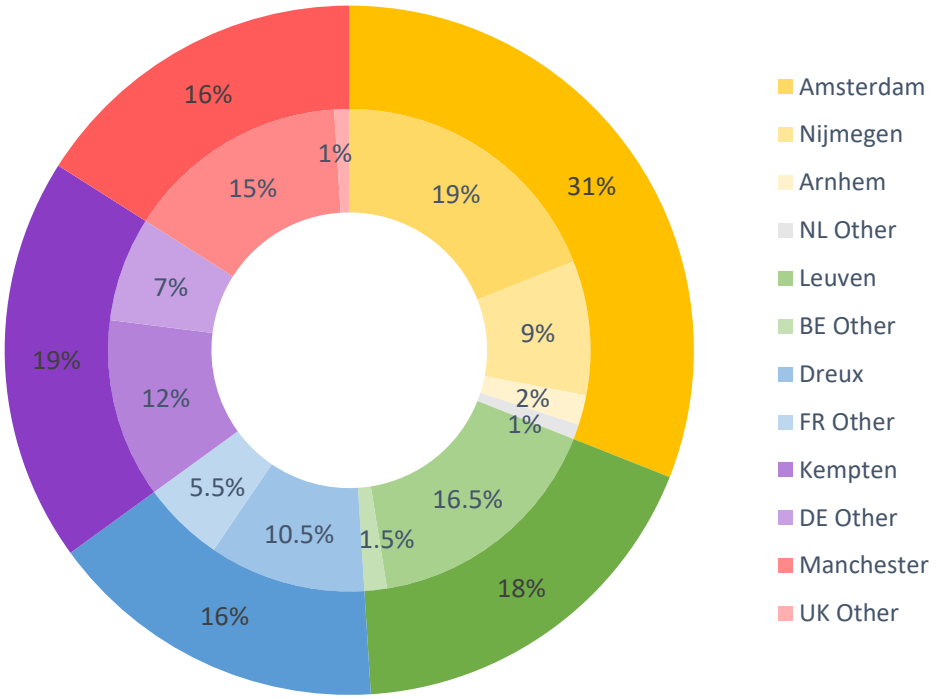


**Figure 3. Respondents' country and city of residence (*N* = 2471)**

Of those who completed the survey, slightly more than half of the respondents identified themselves as male (*n* = 1312, 53%), followed by female respondents (*n* = 1127, 46%), and respondents who identified themselves as 'Other' (*n* = 16, 1%).

**Figure 4** shows the age distribution of male and female respondents (please note that non-binary gender proportions are not reported here due to the low number of completions). As expected, the majority of respondents among both genders were young- to middle-aged adults between the age of 18 and 44 – this proportion was somewhat lower in the case of males (*n* = 733, 56%) compared to females (*n* = 691, 61%).

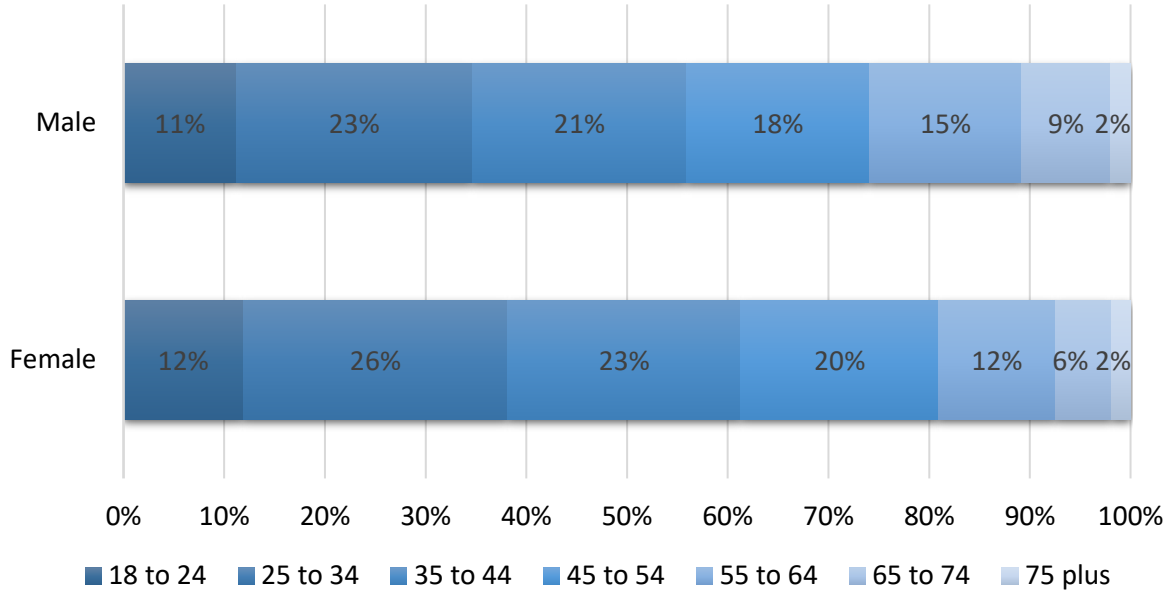


**Figure 4. Age distribution of male (*N* = 1311) and female (*N* = 1127) respondents**

As can be seen in **Figure 4**, respondents from the oldest age group (75+, *n* = 46, 2%) were underrepresented, and this was true of all of the cities where survey data was collected. **Table A1** in the appendix shows the age and gender distribution across the seven pilot cities.

The number of adults and children per household is shown in **Figure 5** and is broken down by city of residence in **Tables A2** and **A3**. Most of the sampled respondents reported living in a household with two or more adults (*n* = 1722, 70%), whereas the remainder reported being the only adult in their household (*n* = 735, 30%).

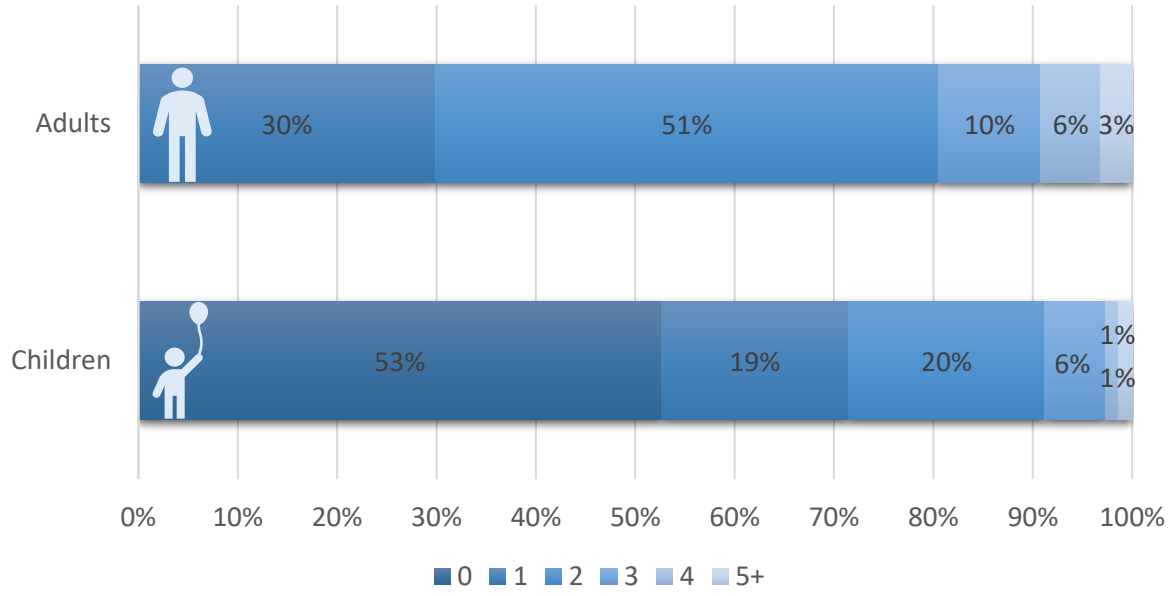


**Figure 5. Number of adults (*N* = 2457) and children in household (*N* = 1852)**

The majority of respondents further indicated living in a household without children (*n* = 975, 53%). Of the respondents who reported sharing their household with children, most reported taking care of either one (*n* = 348, 18 %) or two (*n* = 366, 20%) children.

Overall, the majority of respondents possessed either an undergraduate or postgraduate level degree (*n* = 1675, 67%), indicating an above average education level when compared to the general population of the project partner countries (see **Figure 6**). The complete breakdown of respondents' education level by city of residence is presented in **Table A4**.

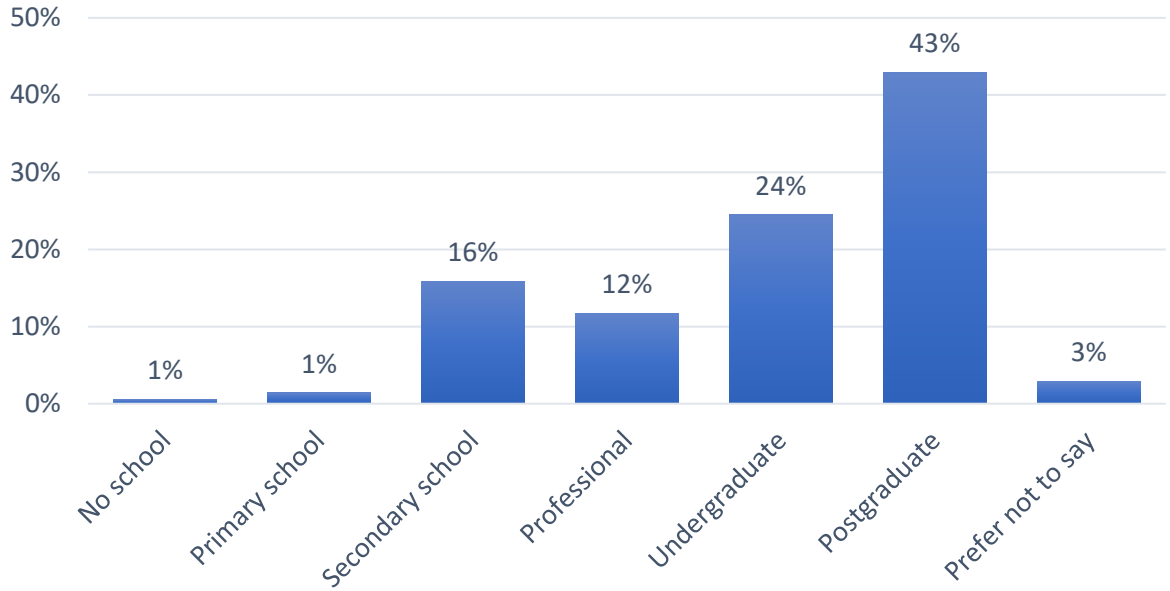


**Figure 6. Respondents' highest education level (*N* = 2472)**

The noticeable deviation of the study sample from the general population in terms of age and education highlights some concerns with the representativeness of the sample. These shortcomings can be broadly explained by the varying data collection methods of the cities, self-selection bias (Greenacre, 2016), and lack of older workers in online panels (Chandler et al., 2019). Only two pilot cities hired polling agencies, enabling the specific targeting of older population groups that are frequently 'digital outsiders', showing lower levels of education, income, and online research participation (Lutz & Hoffmann, 2017). Thus, while every effort was made within pilot city budgets to achieve a representative study sample, this could not always be achieved. Hence, findings about underrepresented groups may be less reliable.

In terms of income, the majority of respondents indicated a household income between £20,000 and £60,000 (*n* = 1146, 46%) – here, £1 = 1.20€ – whereas a substantial proportion of respondents preferred not to reveal their annual household income (*n* = 435, 17%; see **Figure 7**). The distribution of income by city of residence is shown in **Table A5**.

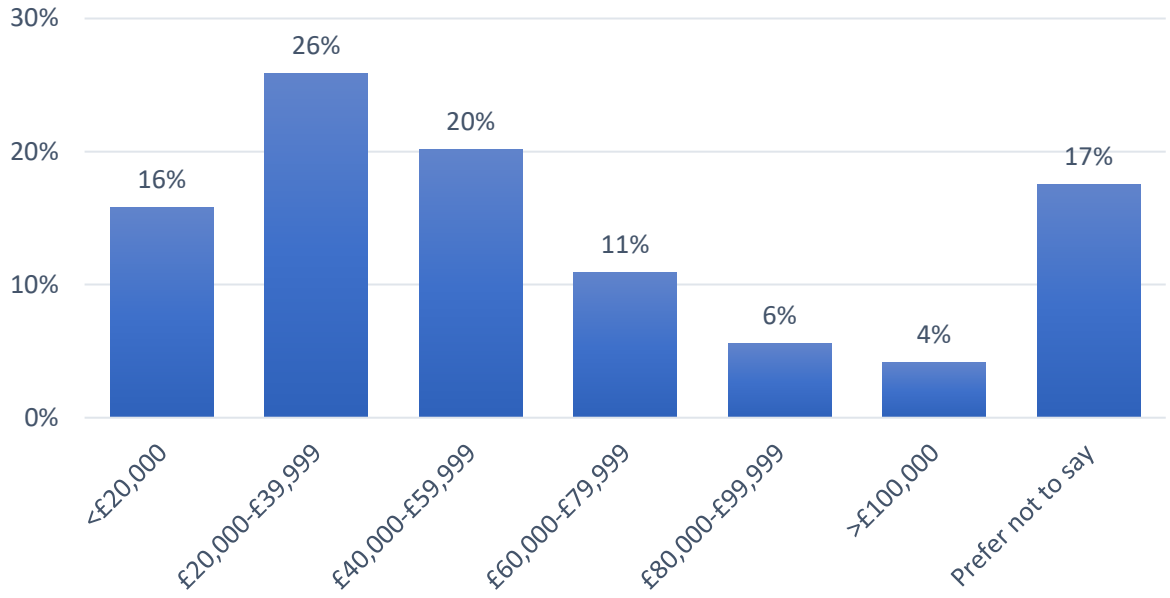


**Figure 7. Respondents' annual household income before tax (*N* = 2487)**

**Figure 8** shows respondents' current employment status across the whole sample, while respondents' employment status for each pilot city is shown in **Table A6**.

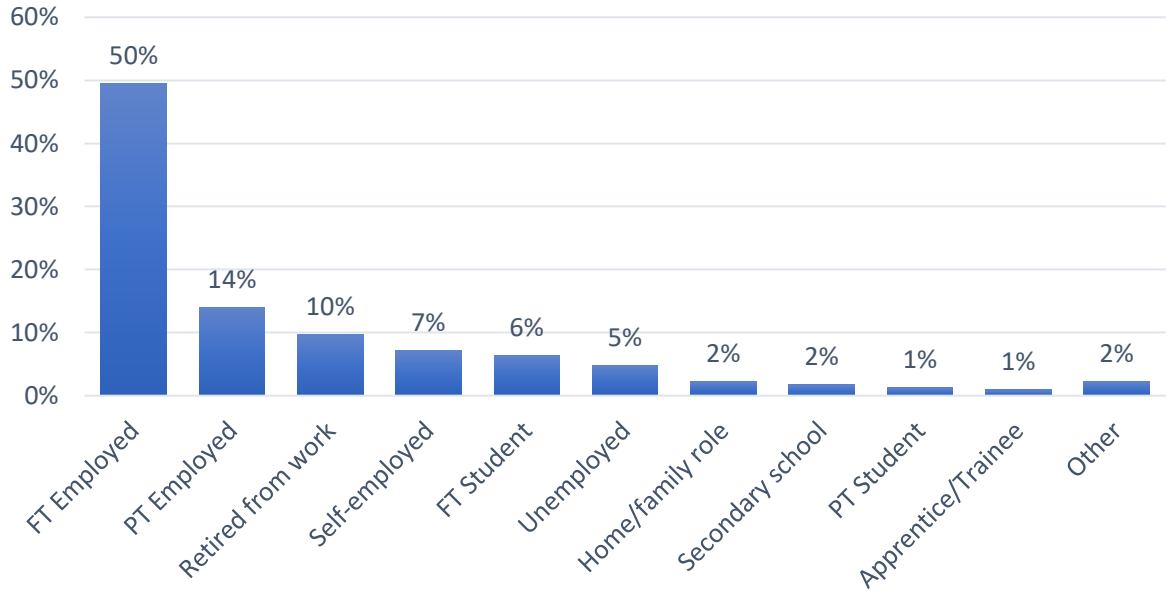


**Figure 8. Respondents' employment status (*N* = 2421)**

At the time of the survey, most of the respondents were either employed full-time (*n* = 1200, 50%) or part-time (*n* = 339, 14%). Smaller proportions of respondents reported being either retired (*n* = 236, 10%), in education (full- or part-time or secondary school; *n* = 228, 9%), self-employed (*n* = 172, 7%) or unemployed (*n* = 116, 5%).

# 2. AVAILABILITY OF VEHICLES, CAR USE, AND CAR USE ATTITUDES OF HOUSEHOLDS

This section explores respondents' availability of household vehicles, their car use, and their general attitudes towards car use. For further summary data on respondents' car use by city of residence, please refer to **Tables A7 to A9** in the appendix.

**Figure 9** shows the availability of vehicles across all of respondents' households. Most reported having at least one car available (*n* = 1767, 73%) and also reported having at least one bicycle available (*n* = 2014, 85%). In comparison, relatively few respondents reported the availability of at least one cargobike (*n* = 231, 11%) or motorbike (*n* = 431, 20%). The availability of household vehicles across cities is shown in **Table A7** in the appendix.

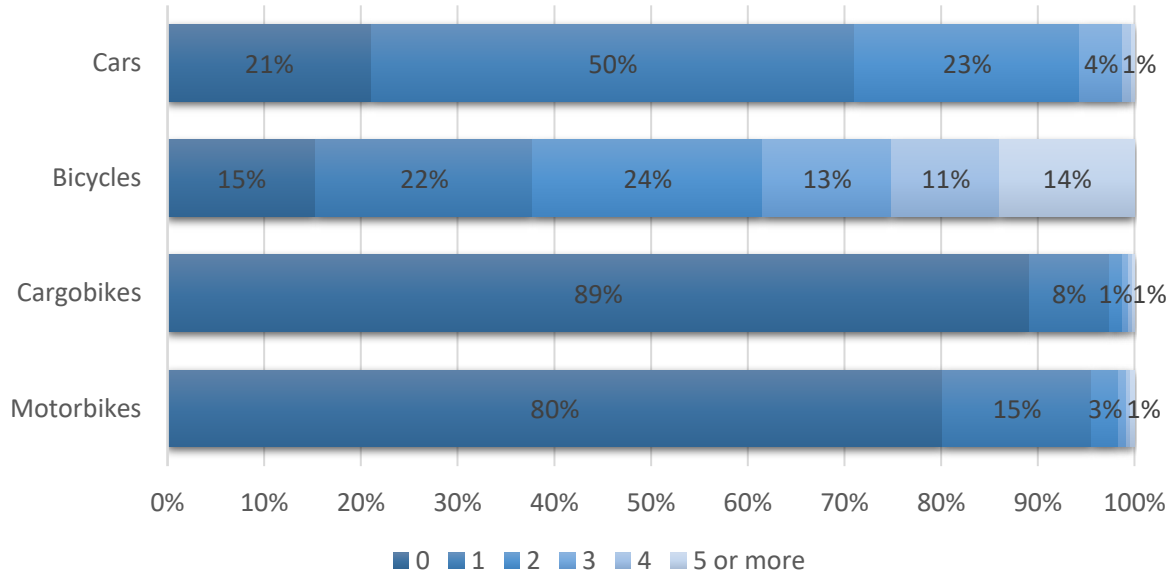


**Figure 9. Availability of household vehicles (*N* Cars = 2411; *N* Bicycles = 2379; *N* Cargobikes = 2125; *N* Motorbikes = 2171)**

## 2.1. Respondents' general car use

Among those respondents who reported having at least one car available in their household and who were also holding a driver's license (*N* = 1815, 73% of the total sample $\mathcal{N}$ = 2493), most indicated that the car they use most often is either a petrol (*n* = 935, 51%) or diesel car (*n* = 685, 38%), with the remainder more sustainable alternatives as illustrated in **Figure 10**.

For a comparison between the different cities of residence, please refer to **Table A8** in the appendix. This table also provides comparisons for subsequent variables of interest in this section (see **Figures 11** to **14**).

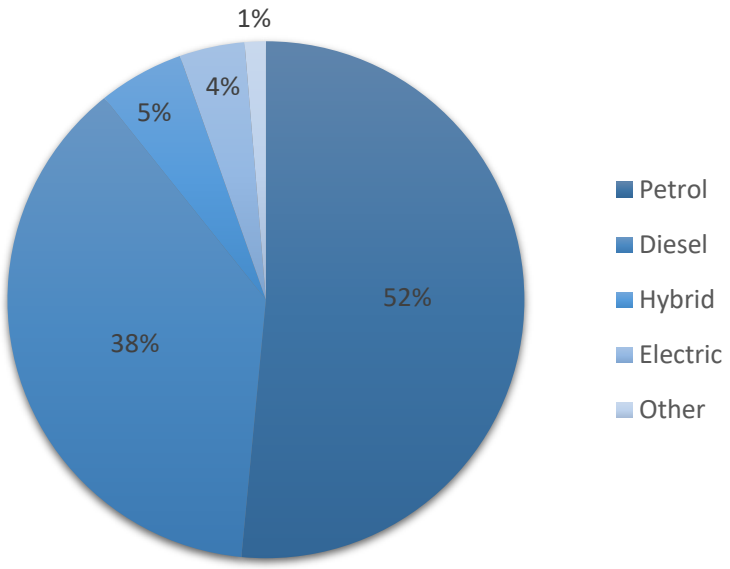


**Figure 10. Type of car (the car used most often by the respondent; *N* = 1815)**

The majority of car users indicated that they are usually the driver (*n* = 1277, 70%) rather than passenger (*n* = 103, 6%), as shown in **Figure 11**. The remaining respondents indicated they regularly switched between being the driver and passenger (*n* = 431, 24%).

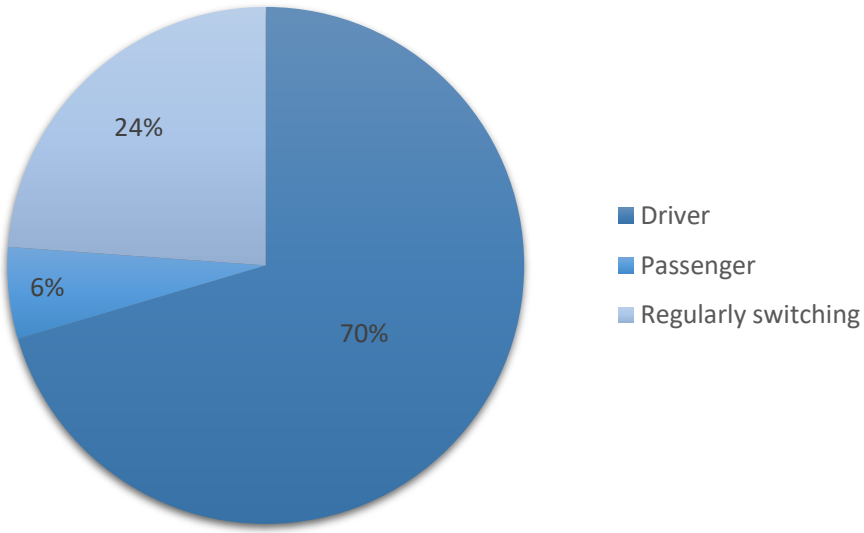


**Figure 11. Regular car use as either driver, passenger or both (*N* = 1813)**

Close to a third of respondents further reported driving alone on most journeys (*n* = 567, 31%), whereas more than half of respondents indicated driving with one or two additional passengers on the majority of their trips (*n* = 977, 54%). This is illustrated in **Figure 12**.

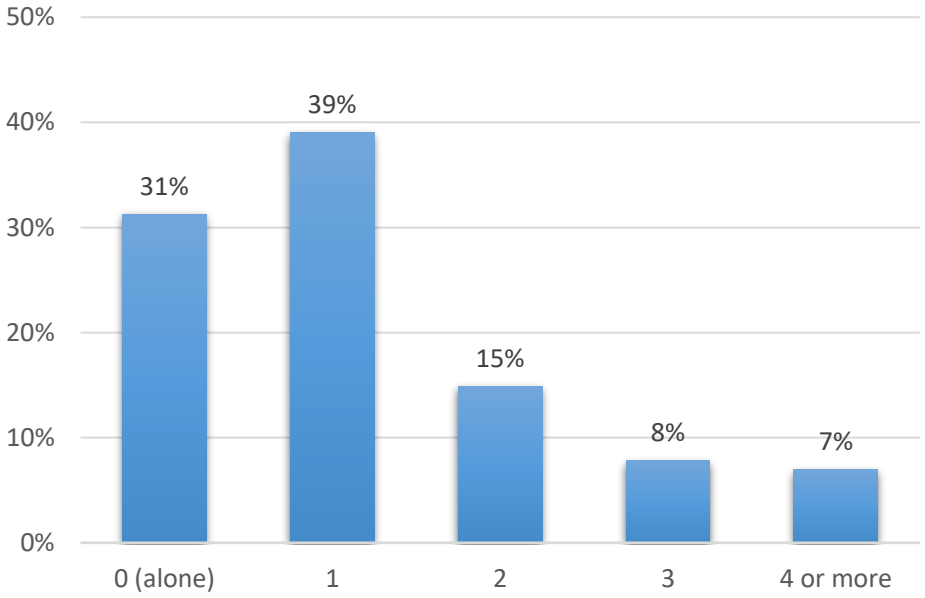


**Figure 12. Driving alone or with passengers (*N* = 1813)**

Furthermore, we asked respondents how frequently they used their car for short trips, defined as trips less than 6 miles (10 kilometres), see **Figure 13**. While a substantial proportion of respondents indicated doing so for at least 4 days per week (*n* = 758, 42%), the majority reported only between one to three times a week (*n* = 933, 52%).

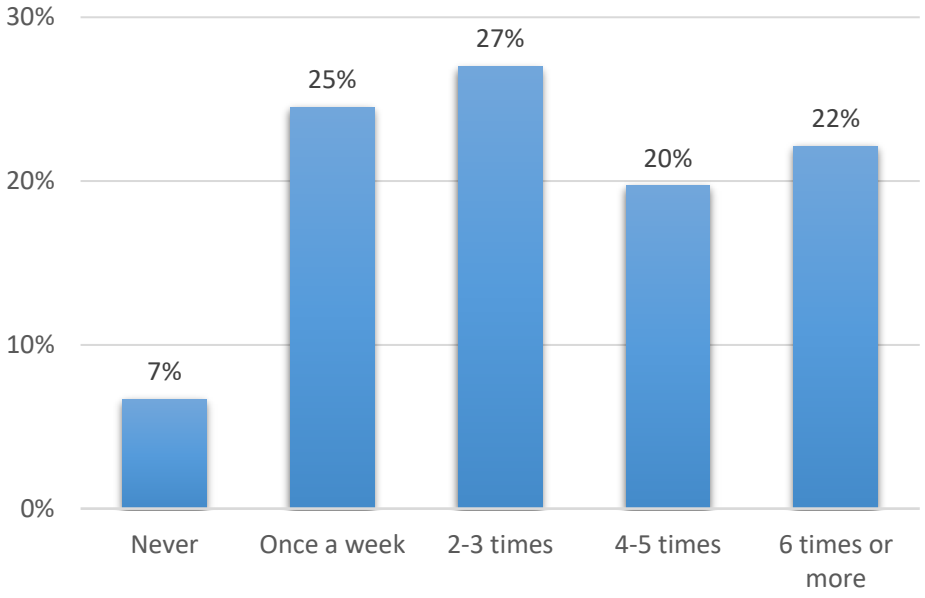


**Figure 13. Frequency of car use for short trips (< 6mi/10km per week; *N* = 1812)**

With regard to trip purpose (see **Figure 14**), the majority of respondents suggested using their car primarily for grocery shopping (*n* = 1272, 70%), visiting friends or family (*n* = 869, 48%), or for commuting to work (*n* = 749, 41%).

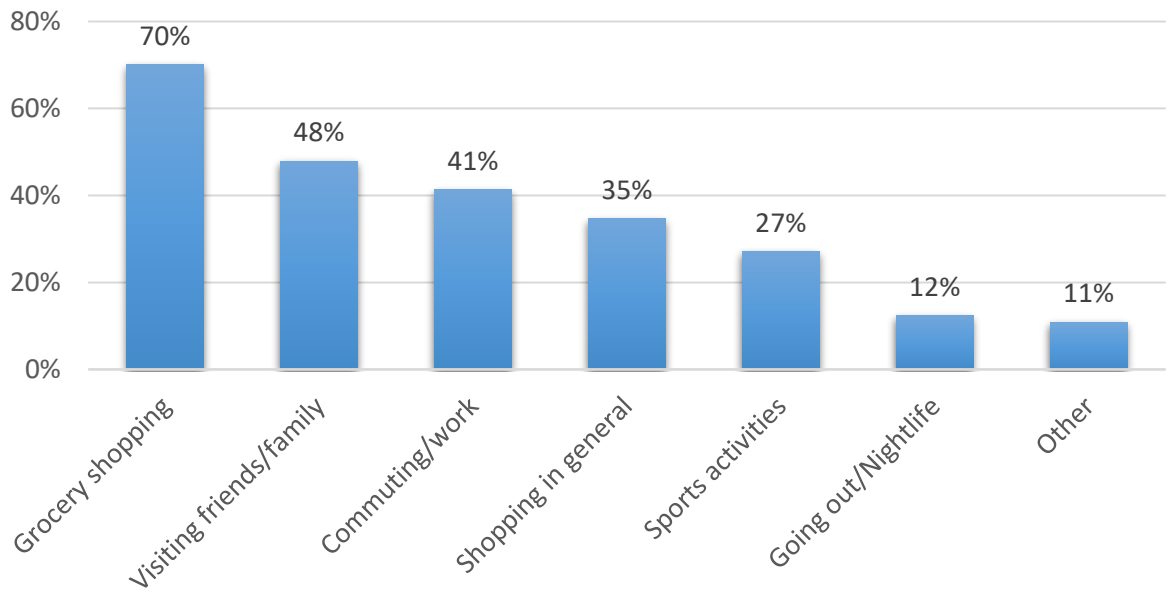


**Figure 14. Most common trip purposes for trips by private car (*N* = 1815)**

## 2.2. Respondents' car use attitudes

Lastly, we investigated car users' attitudes towards car use and the environment by asking them to indicate their level of agreement with eight attitudinal statements rated on a Likert-scale from 1 – Strongly disagree to 7 – Strongly agree (see **Figure 15**).

In general, the majority of respondents showed themselves willing to reduce the amount of travel by car (*n* = 1072, 59%) and most respondents agreed that they would consider purchasing a car with lower $CO_2$ emissions when buying a new car (*n* = 1293, 72%).

A substantial proportion of car drivers also agreed that many of the trips they currently undertake could be undertaken by bicycle (*n* = 606, 33%), albeit to a lesser extent by either public transport (*n* = 420, 24%) or walking (*n* = 324, 18%). Furthermore, one in four respondents indicated that they do not consider themselves to be the kind of person who rides a bicycle (*n* = 456, 25%).

Finally, only one in five respondents indicated that family, friends and/or colleagues encourage them to reduce their car use (*n* = 372, 21%), although the majority believe reducing private car use, regardless of the actions of others, is important (*n* = 1169, 65%).

**Table A9** in the appendix compares respondents' attitudes by city of residence.

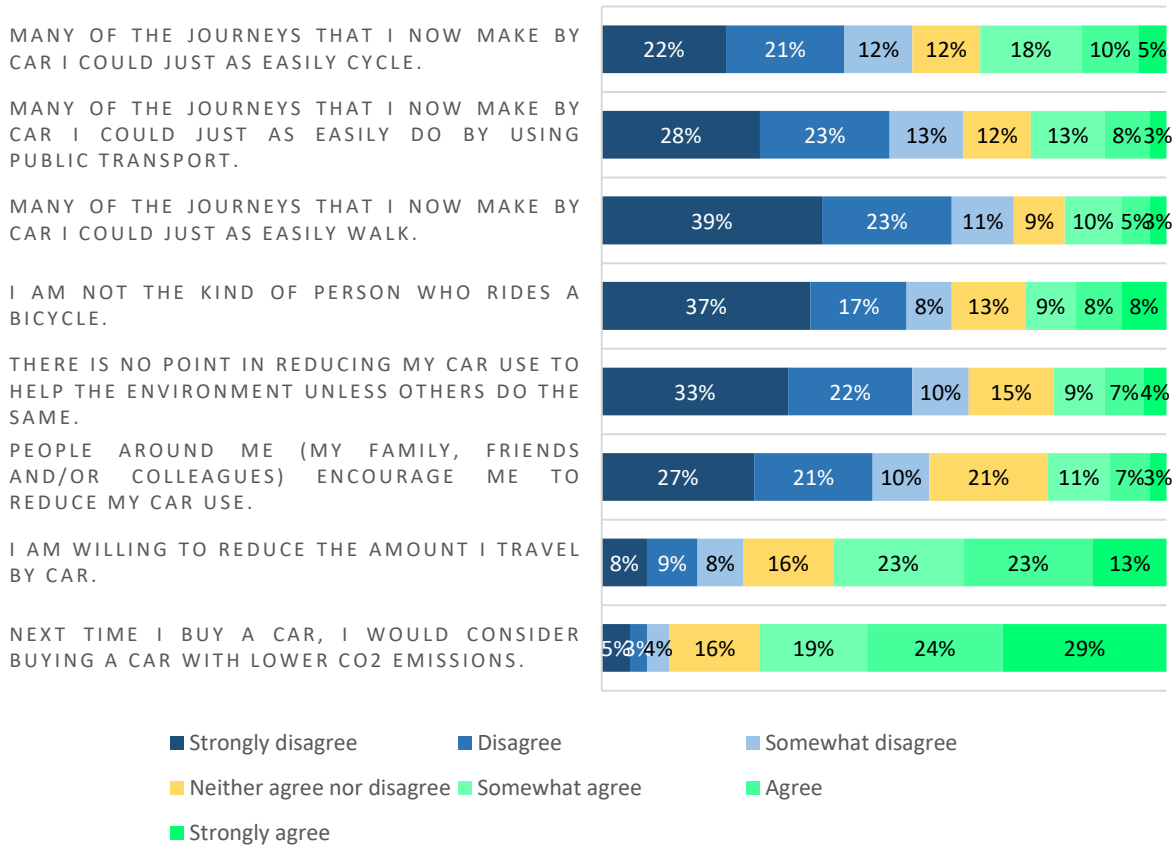


**Figure 15. Respondents' attitudes towards car use and alternatives (*N* = 1806-14)**

# 3. GENERAL TRAVEL BEHAVIOUR

Both car users and non-car users also were asked about their general travel behaviour.

As can be seen in **Figure 16**, the majority of respondents used private motorised transport on at least 1-2 days per week (*n* = 1616, 66%), with corresponding proportions for walking (*n* = 1715, 70%), cycling (*n* = 1352, 54%), and public transport (*n* = 817, 33%). Hence, only walking surpassed the use of private motorised transport in terms of frequency.

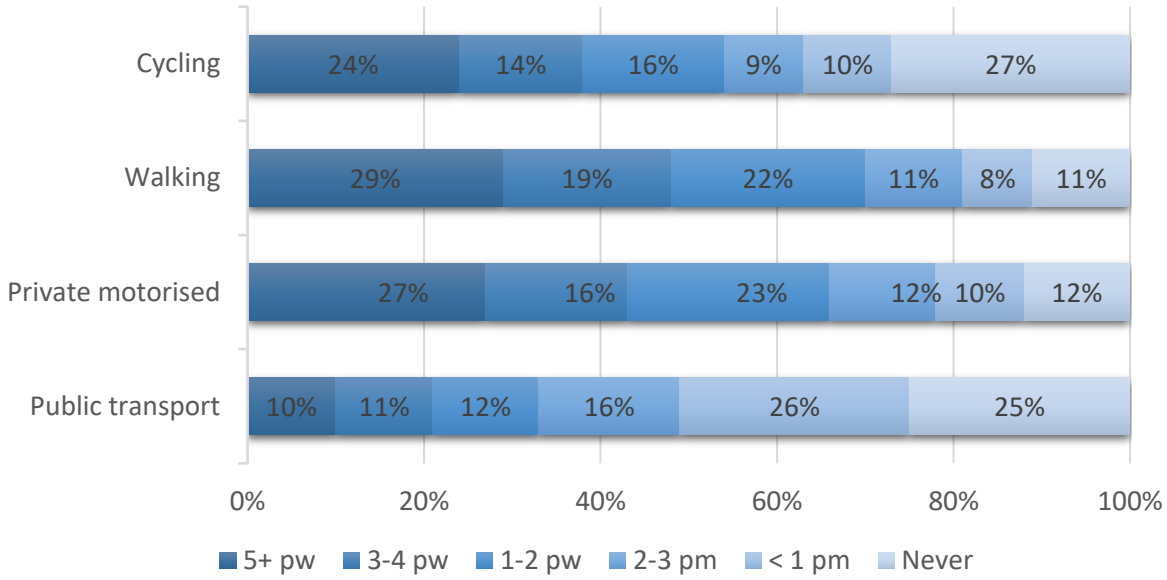


**Figure 16. Respondents' mode use in days per week/month (pw/pm; N = 2481-86)**

**Figure 17** shows that a substantial proportion of survey respondents reported possessing either a public transport pass (*n* = 955, 38%) and/or a railcard (*n* = 747, 30%). However, most respondents indicated that they did not possess either type of pass or card (*n* = 1133, 45%).

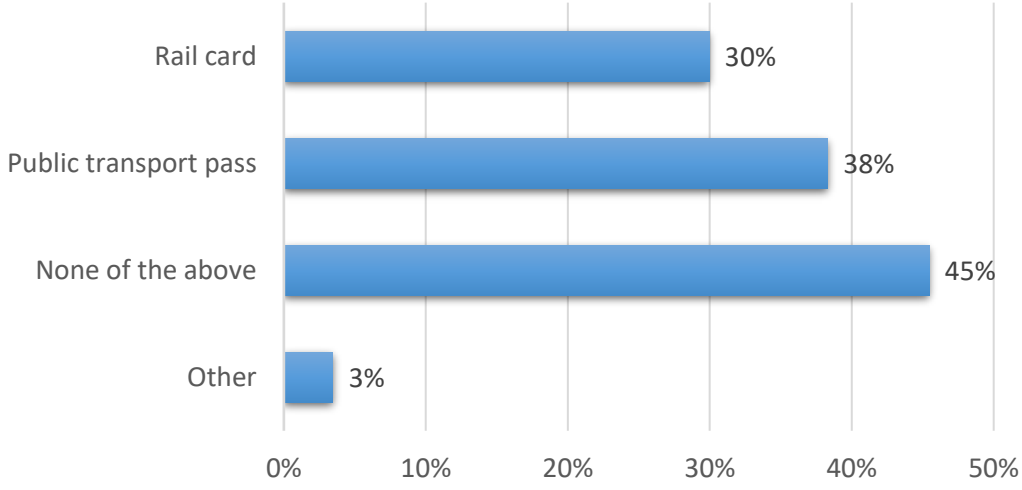


**Figure 17. Proportion of respondents who own a public transport pass (*N* = 2493)**

## 3.1. Respondents' traveller identity

In addition to general travel behaviour, we asked respondents to indicate their traveller identity (see **Figure 18**), as the latter has been shown to be strongly associated with people's actual travel behaviour (Heinen, 2016). In particular, we asked respondents to complete the following sentence: "*I consider myself a…*" with car driver, cyclist, walker, public transport user or multimodal user being the possible answers.

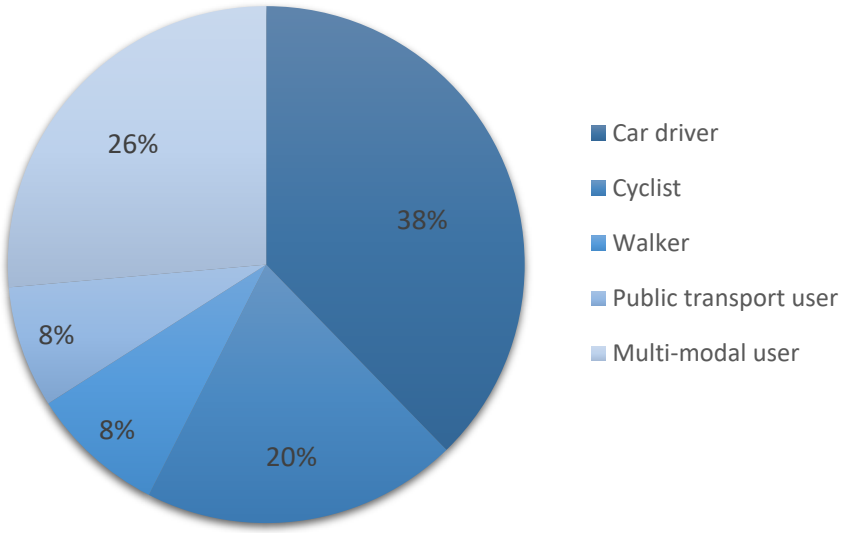


**Figure 18. Respondents' self-reported traveller identity (*N* = 2492)**

Overall, respondents considered themselves to be primarily car drivers (*n* = 940, 38%), followed by respondents identifying themselves as either multimodal users (*n* = 658, 26%) or cyclists (*n* = 493, 20%).

A minority of respondents identified themselves as either walkers (*n* = 211, 8%) or public transport users (*n* = 190, 8%). This is at odds with the data which suggested the majority of individuals reported walking as a mode of travel (see **Figure 16**) but, of course, walking also is a component of other modes – car, bus, and rail.

Descriptive statistics of respondents' general travel behaviour, possession of a public transport pass and traveller identity, for each city of residence can be found in **Table A10** and **Table A11** in the appendix, respectively.

# 4. SHARED MOBILITY USE, INTENTIONS AND BARRIERS

A crucial task of the eHUBS project is to gauge people's interest in using shared micro-mobility hubs. As a result, we introduced the questionnaire with a description of an eHUB facility and asked respondents about their **current shared mobility use**, their **intentions** to use shared vehicles from eHUBS in the future, and to list any **perceived barriers** towards shared mobility use. As in previous sections, results by city of residence are presented in the appendix (see **Table A11** and **Table A12**, respectively).

Our survey results showed that the majority of respondents currently do not use shared mobility options (*n* = 1869, 75%), as is illustrated in **Figure 19**. Some respondents reported using shared cars on a regular basis (*n* = 349, 14%), followed by shared bicycles (*n* = 247, 10%). E-scooters, which still face many legal restrictions and challenges in most countries (Anderson-Hall *et al.*, 2019), were the least popular type of shared vehicle (*n* = 117, 5%).

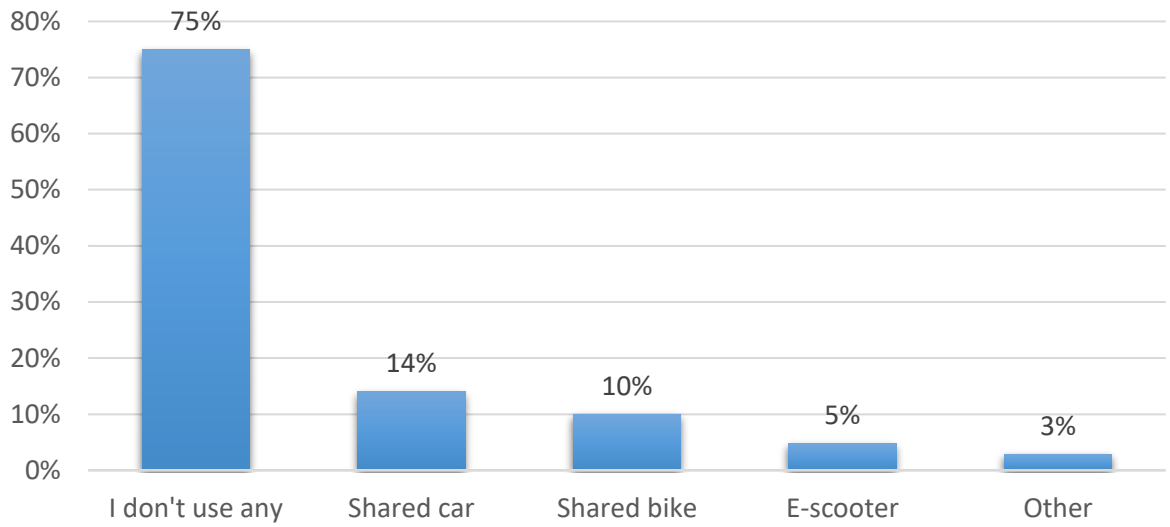


**Figure 19. Respondents' current use of shared vehicles (*N* = 2493)**

Respondents' **interest to use shared electric vehicles** was measured using four statements, "How likely would you be to use [shared vehicle type] from an eHUB in the future if it were available in your city?", rated on a continuous scale ranging from **0 – Extremely unlikely** to **100 – Extremely likely**. The average of respondents' intention scores to use shared electric bicycles (*N* = 2477), cars (*N* = 2460), cargobikes (*N* = 1064), or e-scooters (*N* = 1061), is shown in **Figure 20** across all survey respondents (please note that e-cargobikes and e-scooters were added to the survey at a later point in time).

Overall, respondents showed a **moderate** interest in the use of either shared electric cars (*N* = 2460, *M* = 55.24, *SD* = 33.70) or shared electric bicycles (*N* = 2477, *M* = 51.19, *SD* = 34.37).

In contrast, respondents showed less interest in the use of e-cargobikes ($N$ = 1064, $M$ = 42.52, $SD$ = 34.84) or e-scooters ($N$ = 1061, $M$ = 44.55, $SD$ = 36.60).

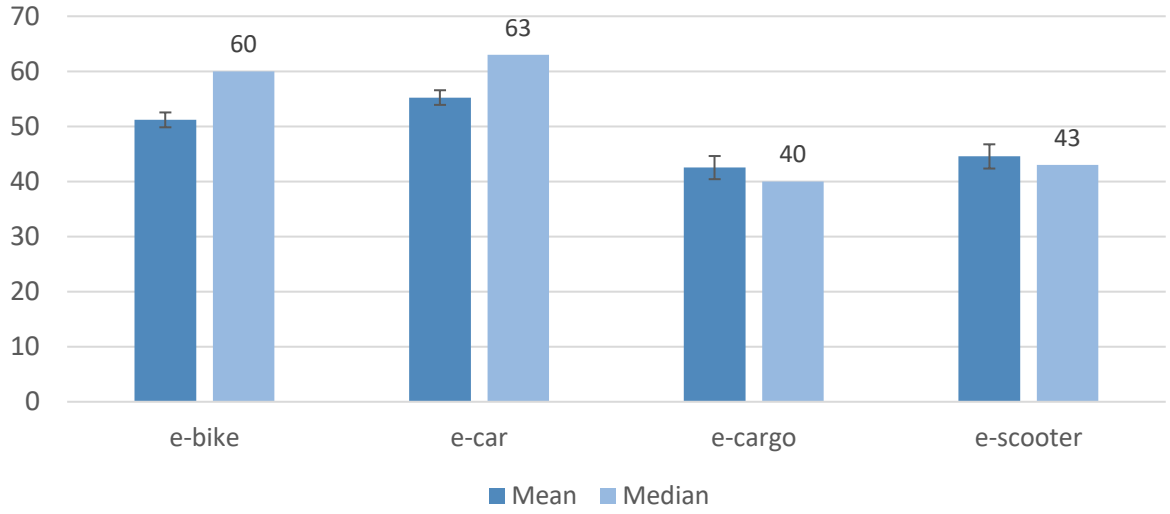


**Figure 20. Mean (95% CIs) and median of respondents' intention to use shared vehicles (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)**

## 4.1. Respondents' intention to use shared vehicles by demographic variables

In terms of **gender**, two statistically significant differences in the intention to adopt shared vehicles emerged (see **Figure 21**). Female respondents expressed marginally more interest in the adoption of e-bikes than males[2], whereas the opposite was true for e-scooters[3].

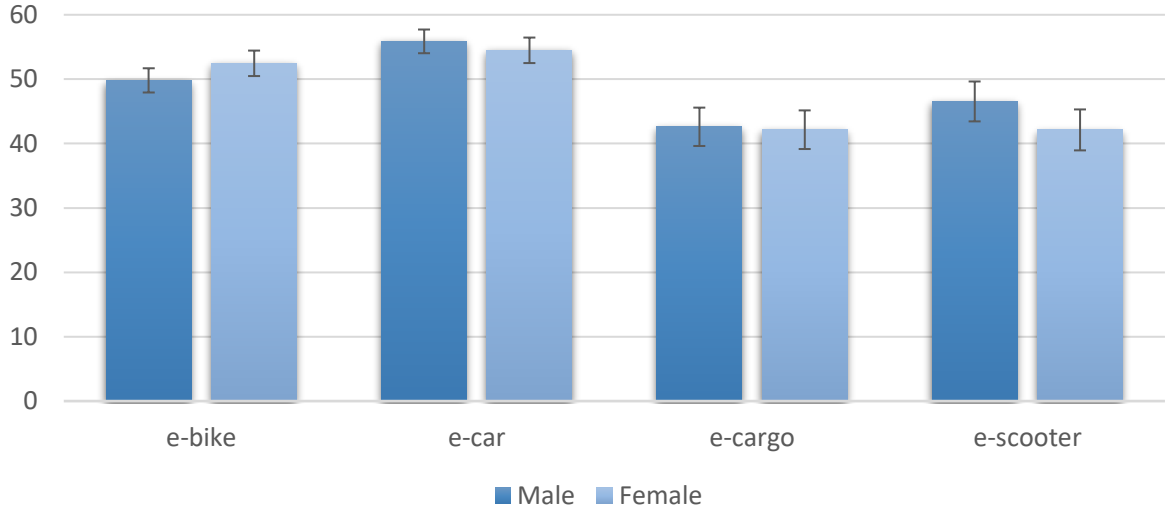


**Figure 21. Mean (95% CIs) of respondents' intention to use shared vehicles by gender (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)**

[2] Mean difference = 2.65 (CI: -.10, 5.40), $t_{2421}$ = 1.89, $p$ = .059 (equal variances assumed)
[3] Mean difference = -4.42 (CI: -8.86, .026), $t_{1040}$ = 1.95, $p$ = .051 (equal variances assumed)

More substantial differences in the intention to adopt shared vehicles emerged between the different **age groups**, with a clear trend being visible (see **Figure 22**).

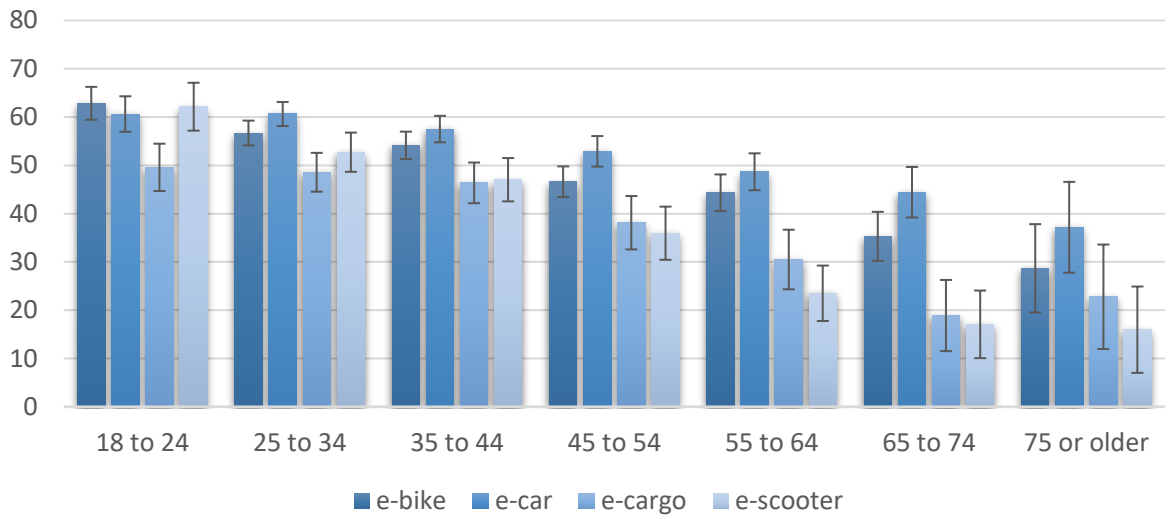


**Figure 22. Mean (95% CIs) of respondents' intention to use shared vehicles by age (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)**

That is, while all groups showed a greater interest in using shared electric cars or bicycles compared to electric cargobikes or e-scooters, the general interest in using shared vehicles **decreased** with respondent age (i.e., older respondents considered themselves less likely to use eHUBS). This trend was statistically significant for all four vehicle types under scrutiny including shared electric bikes[4], electric cars[5], electric cargobikes[6], and electric scooters[7]. Post-hoc tests, comparing intentions across modes and age groups, are reported below.

With regard to **e-bikes**, multiple comparisons revealed, amongst others, that the youngest age group (18 to 24) expressed a greater interest in e-bikes ($M$ = 62.84, $SD$ = 29.48, $n$ = 287) than all other age groups (i.e., all pairwise comparisons were statistically significant).

With regard to **electric cars**, the three younger age groups (18 to 24, 25 to 34, and 35 to 44) did not differ from each other in their intention to use these shared electric vehicles, but expressed a statistically significant greater interest than the remaining age groups.

A similar pattern emerged for **e-cargobikes**. Here, again, the three youngest age groups did not differ in their intention to use e-cargobikes from an eHUB, yet evidenced a statistically significant greater interest than the older age groups (45 to 54, 55 to 64, 65 to 74, and 75+).

[4] One-way Analysis of Variance (ANOVA) – $F_6 = 23.34$, $p < .001$
[5] One-way Analysis of Variance (ANOVA) – $F_6 = 12.34$, $p < .001$
[6] One-way Analysis of Variance (ANOVA) – $F_6 = 12.27$, $p < .001$
[7] One-way Analysis of Variance (ANOVA) – $F_6 = 29.09$, $p < .001$

The intention to use **e-scooters** was found to decrease more gradually, with the youngest age group (18 to 24) expressing the greatest interest (*M* = 62.14, *SD* = 33.94, *n* = 180) and with the oldest age groups (55 to 64, 65 to 74, and 75+) not differing statistically significant in their intention to use e-scooters (average ranging from 16 to 24 on the 100-point scale).

The intention to use shared electric vehicles also varied with the **number of adults** and **number of children** in the household, as shown in **Figure 23** and **Figure 24**. As can be seen below, the interest in using any shared vehicle from an eHUB was greater in households with 3 or more adults compared to households with two adults or single-person households. Notably, respondents without children showed the least interest in shared electric vehicles.

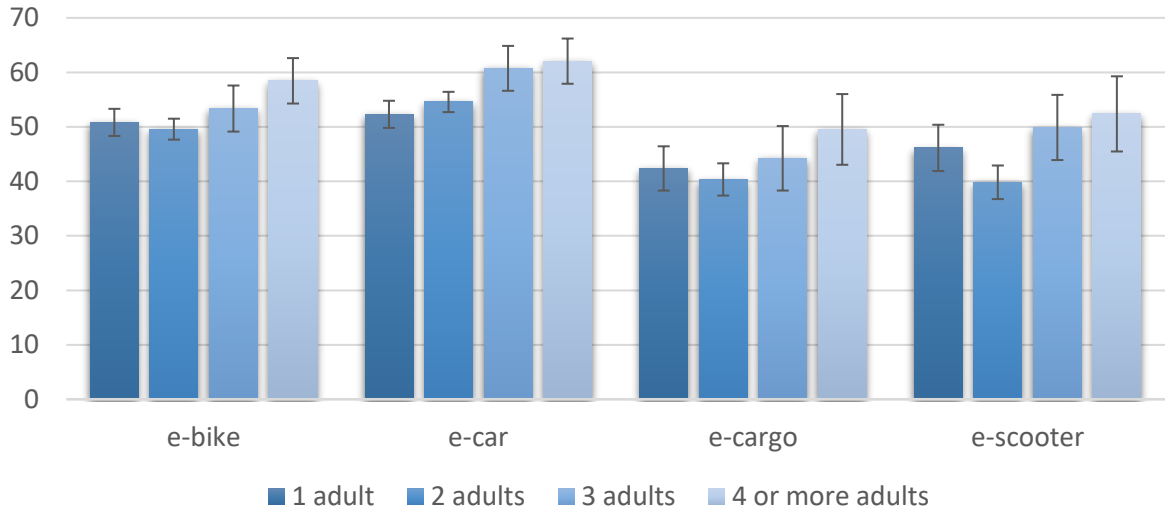


**Figure 23. Mean intention to use shared vehicles (95% CIs) by number of adults (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)**

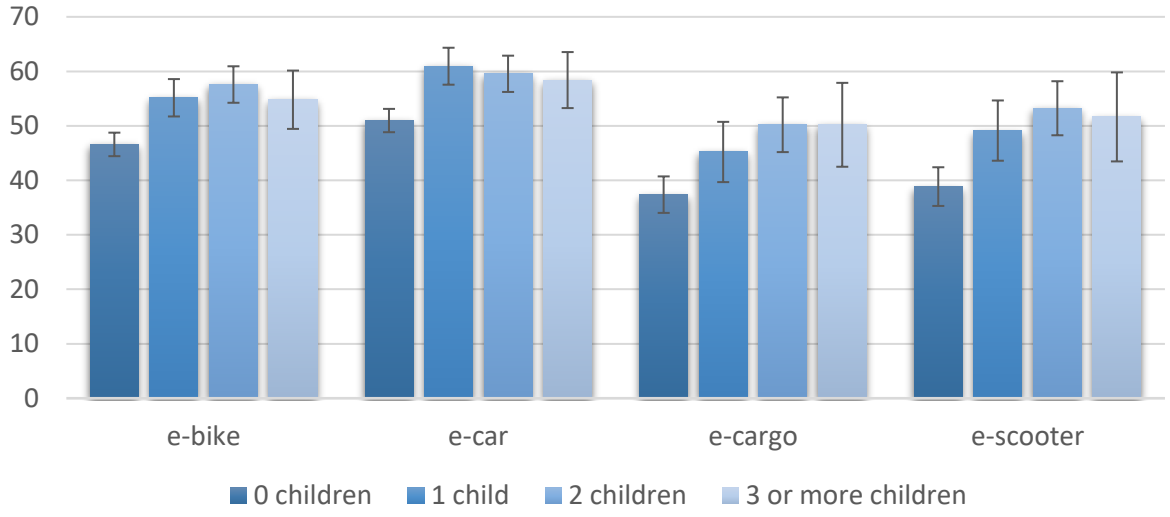


**Figure 24. Mean intention to use shared vehicles (95% CIs) by number of children (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)**

In terms of **education level**, all groups indicated a statistically significant greater interest in shared electric vehicles than those with either primary or secondary school education (see **Figure 25**). Exceptions to this were the interest in shared e-bikes (no difference between school and university)[8] and e-cars (no difference between school and prefer not to say)[9].

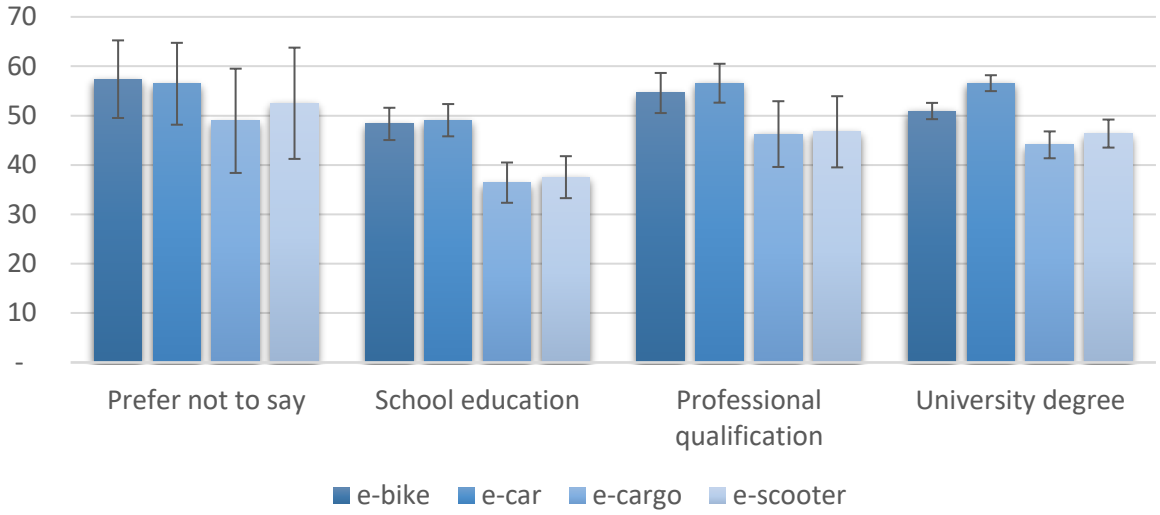


**Figure 25. Mean intention to use shared vehicles (95% CIs) by education level (Likert-scale ranging from 0 – Extremely unlikely to 100 – Extremely likely)**

Finally, respondents showed a preference for shared e-bikes or e-cars at all levels of **income**, except for respondents in the highest income group (> £100,000), who did not appear to show a preference towards any shared electric vehicle type (see **Figure 26**).

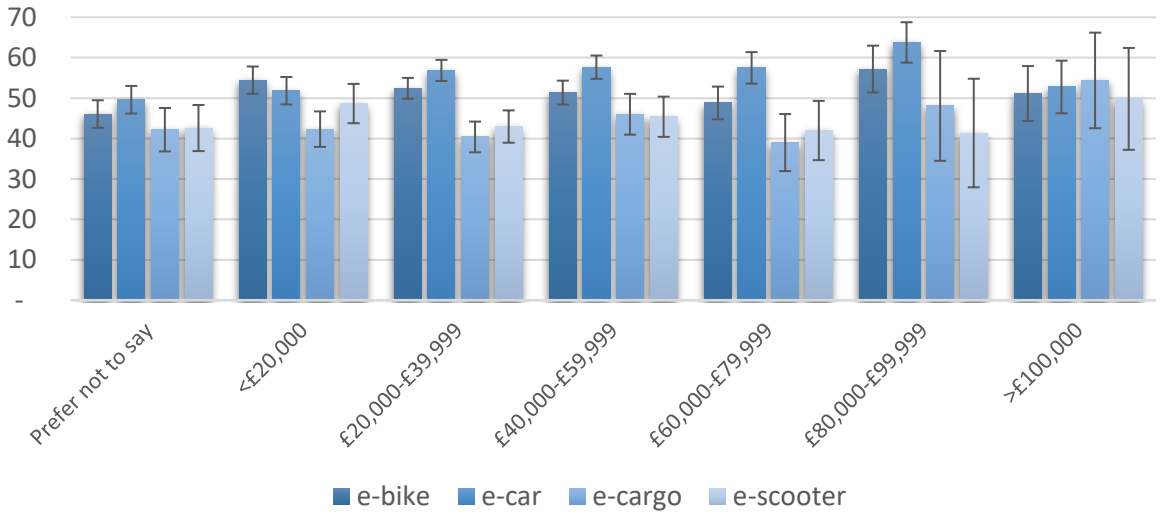


**Figure 26. Mean intention to use shared vehicles (95% CIs) by income level (Likert-scale ranging from 0 – Extremely unlikely to 100 – Extremely likely)**

[8] Mean difference = 2.62 (95% CI: -1.03, 6.26), Std. error = 1.86, $p$ = .16
[9] Mean difference = 7.38 (95% CI: -1.06, 15.82), Std. error = 4.31, $p$ = .09

## 4.2. Respondents' intention to use shared vehicles by traveller identity

To learn more about the potential target groups of eHUBS, we compared the intention to use shared electric vehicles from an eHUB between different traveller identities (**Figure 27**), revealing some significant differences for three of the four shared vehicle types.

In particular, whereas there were no significant differences for the interest in e-bikes, those who identified themselves as 'Walker' showed significantly less interest in **shared electric cars** compared to car drivers, cyclists, or multi-modal users[10]. A possible explanation for the lower interest in e-cars could be that half of the regular (commute) trip journeys completed by Walkers are equal to or less than 3 miles (*n* = 109, 49.5%) – a distance that can easily be covered by either walking or by bicycle.

Cyclists, in turn, expressed a significantly greater interest in **e-cargobikes** than all other groups[11]. While the majority of those identifying themselves as cyclists, cycle on at least 3 days a week (*n* = 441, 90%), only a minority are in possession of a(n) (e-)cargobike (*n* = 66, 16%), hence providing a likely explanation for the greater intention to use shared electric cargobikes as provided by eHUBS.

Finally, those identifying themselves as public transport (PT) users expressed a significantly greater interest in **shared electric scooters** than other groups[12], suggesting that shared e-scooters and e-bikes could either replace PT trips or serve as PT access and egress modes.

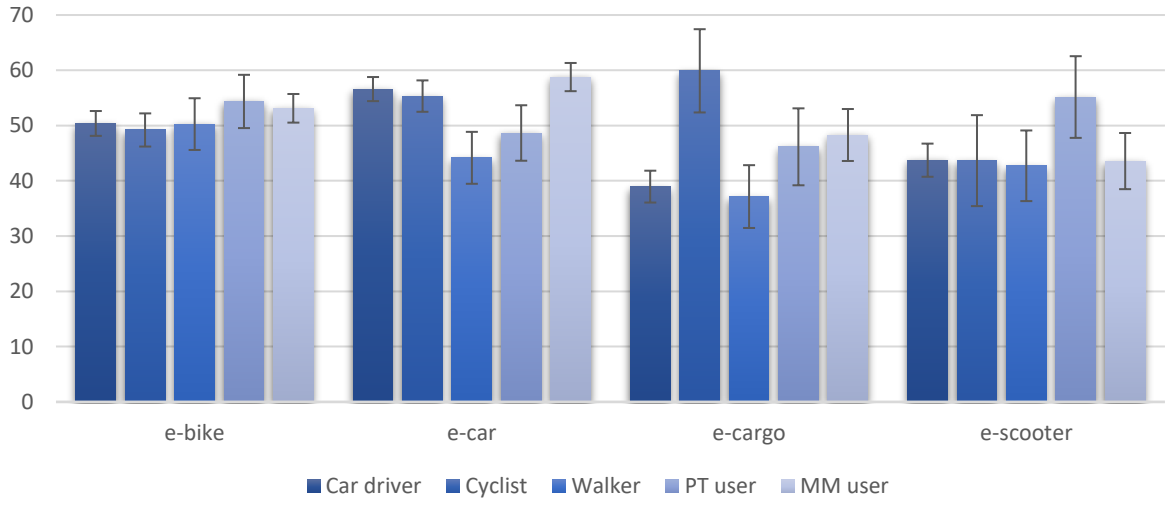


**Figure 27. Mean intention to use shared vehicles (95% CIs) by traveller identity (Likert-scale ranging from 0 – Extremely unlikely to 100 – Extremely likely)**

[10] One-way Analysis of Variance (ANOVA) – $F_4 = 9.73$ $p < .001$
[11] One-way Analysis of Variance (ANOVA) – $F_4 = 8.48$ $p < .001$
[12] One-way Analysis of Variance (ANOVA) – $F_4 = 2.09$ $p = .08$

## 4.3. Respondents' intention to use shared vehicles by frequency of short trips

A particular point of interest for the eHUBS project, cities, policy makers and shared mobility providers, is the potential to replace trips made by private car with more sustainable modes. Hence, we compared car users' interest in using shared electric vehicles based on the frequency of short trips they complete by car in a typical week (see **Figure 28**).

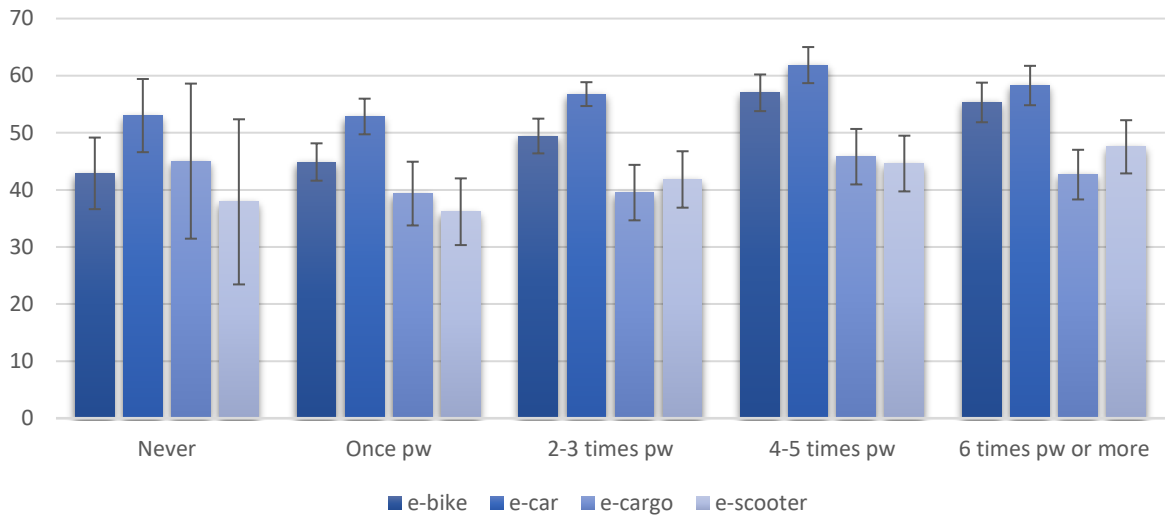


**Figure 28. Mean intention to use shared vehicles (95% CIs) by short trip frequency (Likert-scale ranging from 0 – Extremely unlikely to 100 – Extremely likely)**

For **shared electric bicycles**, those using their car for short trips at least four times a week showed a significantly greater interest than those using their car less frequently or never for short trips[13]. This is a promising result, as it suggests that those using their car frequently to cover short distances, may be willing to switch some of their trips to e-bikes once available.

For **shared electric cars**, a similar tendency is observed, with a significantly greater interest expressed by those with a higher frequency of short trips per week[14]. However, here, only car drivers using their car for short trips 4-5 times per week differ significantly from those with a lower short trip frequency. Those using their car for short trips 6 times per week or more only differ statistically significant from those making short trips by car once a week[15].

Finally, for **shared e-scooters**, those using their car for short trips at least 4 times a week differ statistically significant from those using their car for short trips once per week[16]. Again, these results indicate potential to shift a proportion of short car trips to LEVs.

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[13] One-way Analysis of Variance (ANOVA) – $F_4 = 9.79$, $p < .001$
[14] One-way Analysis of Variance (ANOVA) – $F_4 = 4.21$, $p < .001$
[15] Mean difference = 5.42 (95% CI: .94, 9.90), Std. error = 2.28, $p = .02$
[16] One-way Analysis of Variance (ANOVA) – $F_4 = 2.61$, $p = .04$

## 4.4. Perceived barriers to shared mobility use

In order to learn more about people's interest in and intentions to use shared mobility options, we asked respondents to select, from a list of potential barriers, those barriers that prevented them from using shared mobility options (see **Figure 29**). In addition, respondents could name their own barriers via a comment function.

A major deterrent from using shared vehicles that emerged included people's satisfaction with their own travel mode(s), which was cited by 41% of survey respondents. Yet, more specific barriers related to the use of shared mobility were cited as well. In particular, other (perceived) barriers included concerns about the distance to reach shared vehicle locations (21%), the availability of shared vehicles (20%), the cost of renting vehicles (17%), and being unable to leave vehicles where desired (16%), as in free-floating shared vehicle systems.

These perceived barriers can be directly addressed by shared mobility providers through competitive pricing, ensuring sufficient vehicle availability at all times (if necessary, through redistribution), creating a large number of shared vehicle locations, and offering users the opportunity to leave vehicles where desired (or at an eHUB station for a possible discount).

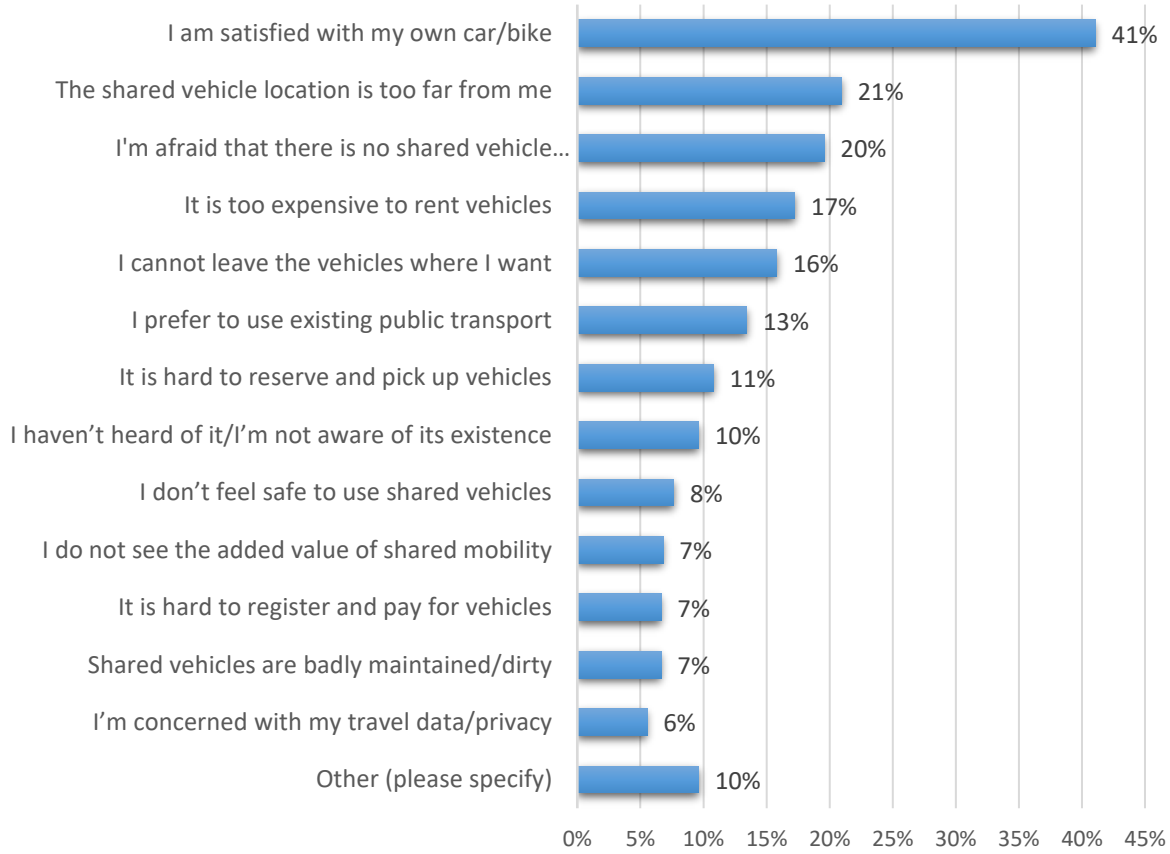


**Figure 29. Perceived barriers to shared mobility use (*N* = 2493; see also Table A12)**

# 5. COMMUTE TRIP DETAILS AND ALTERNATIVES

In this section, we asked respondents to outline the steps of their most regular (commute) trip by indicating the duration of use and type of mode used in each step. In addition, we asked respondents about the distance, start time and frequency of their trip. Finally, respondents were asked to indicate how satisfied they are with their current regular trip and whether eHUBS-based alternatives could pose a viable substitute for their current trip.

**Figure 30** shows the modes that respondents used during the various stages of their most regular trip. As can be seen in the figure, car use alone, with passengers or car sharing (*n* = 1033, 42%), cycling including bike sharing (*n* = 701, 29%), and walking (*n* = 605, 25%), jointly accounted for 96% of respondents' first step of their regular trip. Public transport (i.e., local bus services or light-rail/metro/train) was most common at the second trip stage (*n* = 366, 26%), whereas walking was most common at the third trip stage (*n* = 377, 40%), as respondents arrived at their destination by covering the last metres on foot.

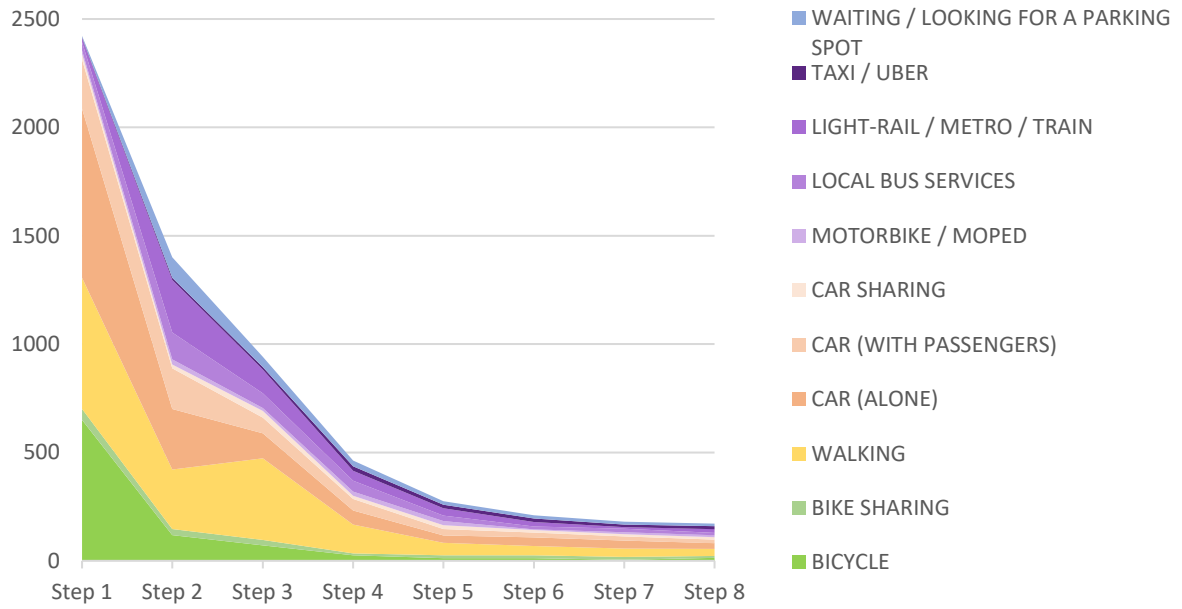


**Figure 30. Modes used during respondents' regular (commute) trip (*N* = 2422)**

In terms of trip distance (see **Figure 31**), most journeys were reported to be short-distance trips of 5 km or less (*n* = 965, 40%), followed by medium distance trips of 6 to 10 km (*n* = 497, 21%), suggesting that eHUBS have potential to be a viable alternative for these trips.

For those who **drive alone** at any one step of their commute and who also reported their trip distance (*N* = 1057), almost half of reported trips were reported to be 10km or less (*n* = 511, 48%), indicating the potential for eHUBS to substitute at least some of these trips with more sustainable shared vehicles.

About a quarter of trips were reported to be 11 to 30 miles (*n* = 572, 24%), whereas long-distance trips (> 30 miles) accounted for the remaining journeys (*n* = 360, 15%). For these longer distances, these results provide evidence that eHUBS offer much scope to facilitate access and egress trips to public transport.

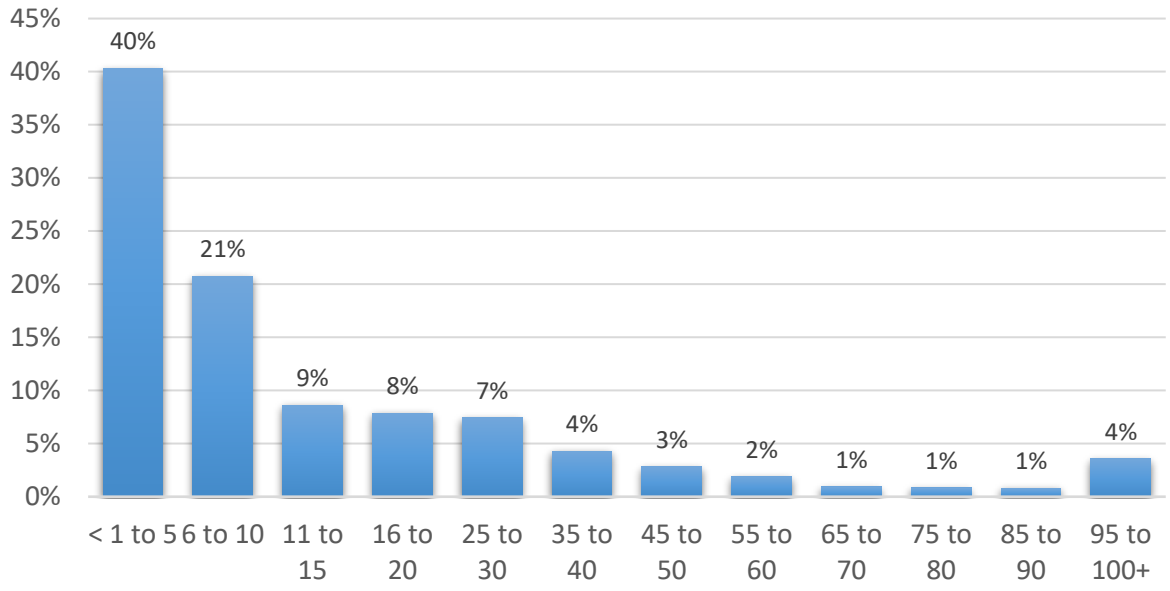


**Figure 31. Respondents' regular (commute) trip distances in kilometres (*N* = 2394)**

With regard to the start time of respondents' most regular (commute) trip (**Figure 32**), there is a clear peak in the early morning hours, suggesting that the majority of respondents begin their regular trip between 6 and 10 am in the morning (*n* = 1822, 75%).

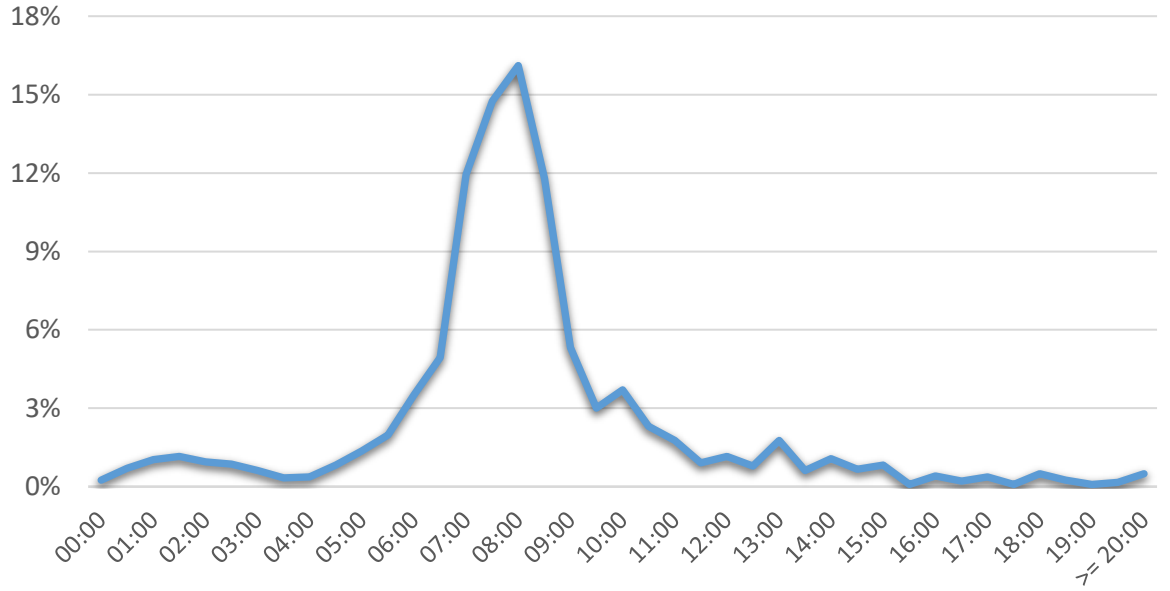


**Figure 32. Respondents' regular (commute) trip start time (*N* = 2427)**

The majority of respondents further indicated that they followed their regular trip routine on 3-4 days (*n* = 795, 32%) or 5 or more days (*n* = 1129, 46%) per week (see **Figure 33**). Due to the impact of COVID, however, further studies should explore the changes that have and will continue to occur, to inform future investment in facilities. Jointly, the 'new norm' and the role of eHUBS in multi-modal trip making, may open further development opportunities.

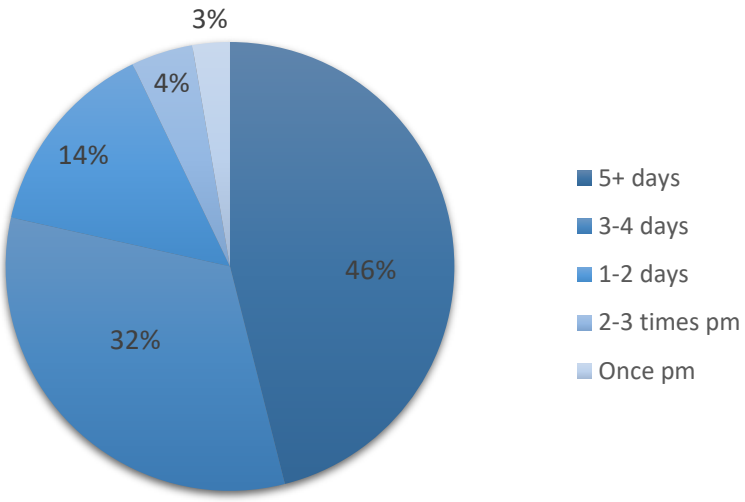


**Figure 33. Frequency of respondents' regular (commute) trip (*N* = 2451)**

Overall, on a continuous scale ranging from 0 – Very dissatisfied (VD) to 100 – Very satisfied (VS), most respondents indicated that they were satisfied with their regular (commute) trip. In particular, the majority of respondents reported being either (somewhat) satisfied (i.e., Satisfaction score between 51 to 75; *n* = 640, 26%) or very satisfied (i.e., Satisfaction score between 75 to 100; *n* = 1432, 59%) with their regular trip, as illustrated in **Figure 34**.

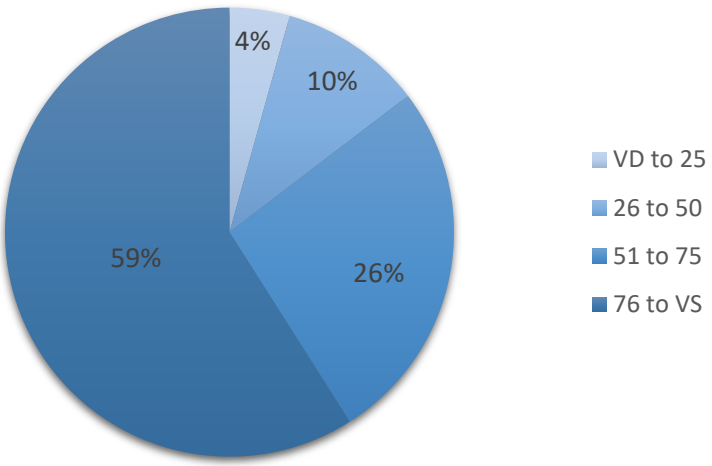


**Figure 34. Respondents' satisfaction with their regular (commute) trip (*N* = 2427)**

This suggests that effort will be needed (e.g., marketing or incentives) to influence behaviours of those cohorts with characteristics conducive to the use of shared mobility services (e.g., current car drivers, households with children, or younger age groups).

## 5.1. Simplified Stated Preferences (SP) for respondents' regular commute trip

Finally, we asked what eHUBS-based alternatives including shared electric cars or bicycles for the entire trip, or using shared electric cars or bicycles in combination with public transport, could serve to replace respondents' current regular (commute) choice. Here, half of respondents indicated that they would neither use shared electric cars (*n* = 1228, 50%) nor shared electric bikes (*n* = 1207, 50%) from an eHUB, and this was especially the case when considering their use in combination with existing public transport (see **Figure 35**).

That is, most respondents indicated they would neither consider the combined use of shared electric cars and public transport (*n* = 1559, 66%), nor the combined use of shared electric bikes and public transport (*n* = 1492, 63%).

However, the results also suggested that a substantial proportion of respondents are willing to consider using shared bicycles from an eHUB for at least a few trips (*n* = 1201, 50%). As much as 15% would even consider using shared bicycles for most or all of their regular trips (*n* = 369). Similarly, 50% would consider using a shared electric car for at least a few trips (*n* = 1205), including 16% who indicated they might use a shared electric car from an eHUB for most or all of their trips (*n* = 393).

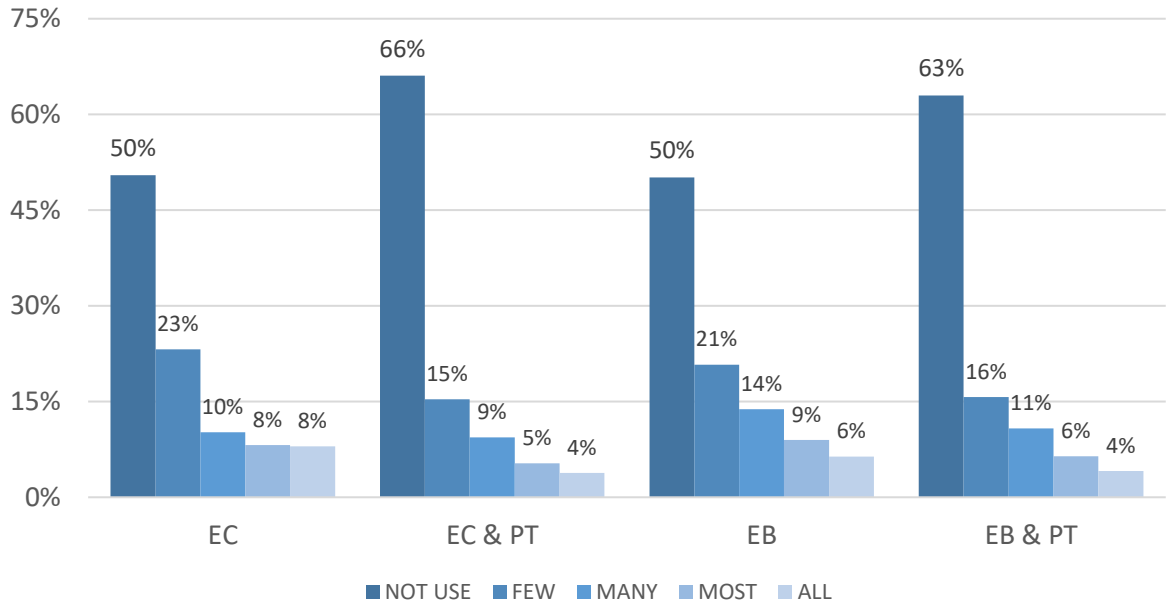


**Figure 35. Respondents' willingness to use shared vehicles from an eHUB for their regular (commute) trip (EC = Electric Car, EB = Electric Bike, PT = Public transport)**

Whilst the questionnaire has revealed segments of the population that have unfavourable opinions towards eHUBS, an important understanding of the characteristics of these cohorts informs the direction in which to take future investment in the business, whether this be in terms of location, design, or marketing.

Respondents' willingness to use eHUBS-based alternatives for their regular (commute) trip by city of residence are presented in **Table A13** in the appendix.

Next, we examined respondents' willingness to use shared vehicles from an eHUB for their regular (commute) trip based on their self-reported traveller identity. As the combination of using shared electric vehicles and public transport was considered to be the least attractive option by respondents, these will be ignored below.

With regard to using **shared electric cars** as a regular (commute) trip alternative (see **Figure 36**), current car drivers showed the greatest interest (*n* = 563, 61% would use for at least a few trips). This is a promising result because, if car users were to substitute their own car(s) in favour of shared EVs, emission savings could become a reality. Yet, the greater interest by the car drivers was offset by the lesser interest of non-car groups, hence decreasing the total proportion of respondents who would use shared EVs (i.e., 50%, **Figure 35**).

Current cyclists showed the least interest (*n* = 164, 34% would use for at least a few trips). However, all non-car users showed some interest in using shared electric cars, suggesting that trips already being made using active and sustainable modes could be partly replaced by using shared electric cars, thus leading to a negative net balance for carbon.

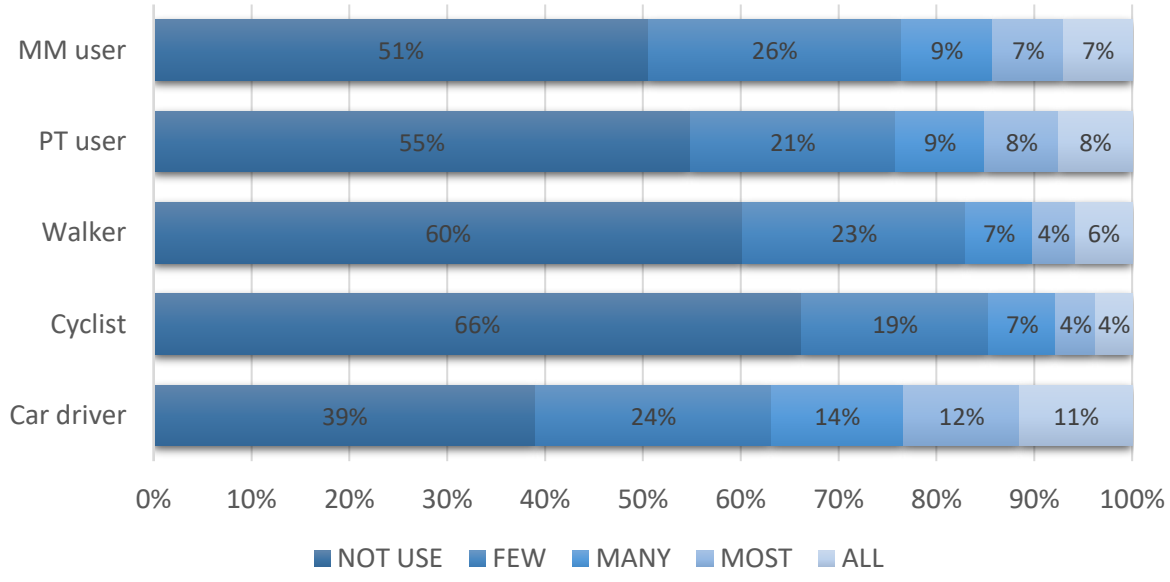


**Figure 36. Willingness to use shared electric car as a regular (commute) trip alternative by traveller identity (*N* = 2432)**

When considering the use of **shared electric bicycles** as a regular (commute) trip alternative (see **Figure 37**), public transport users showed the greatest interest (*N* = 99, 54% would use for at least a few trips). On average, all non-car users showed a greater interest in using shared electric bikes (47-54%) compared to shared electric cars (34-49%).

Among those who identified themselves as car drivers (*N* = 911), half indicated they would consider using shared e-bikes for at least a few of their regular (commute) trips (*n* = 453, 50% would use for at least a few trips).

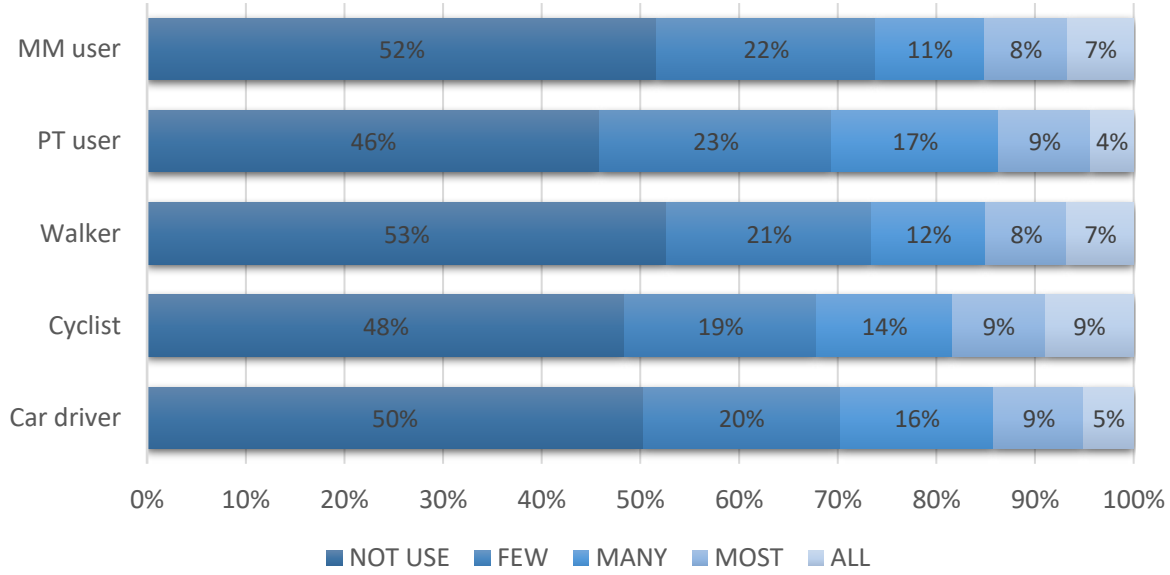


**Figure 37. Willingness to use shared electric bike as a regular (commute) trip alternative by traveller identity (*N* = 2407)**

# 6. FOOD SHOPPING TRIP DETAILS AND ALTERNATIVES

In addition to respondents' regular (commute) trip, we asked respondents to detail the steps of their regular food shopping trip (see **Figure 38**).

As with respondents' regular (commute) trip, walking (*n* = 734, 30%), cycling (*n* = 516, 21%) and car use (*n* = 1106, 46%) accounted for the most commonly used transport modes at the first and subsequent steps of their food shopping trip. Public transport options, including local bus services, light-rail, metro, or train, were used less frequently by respondents to collect groceries. That is, whereas the share of public transport options was about a quarter for regular (commute) trips at the second trip stage (*n* = 366, 26%), this proportion decreased substantially for respondents' food shopping trips (*n* = 50, 6%).

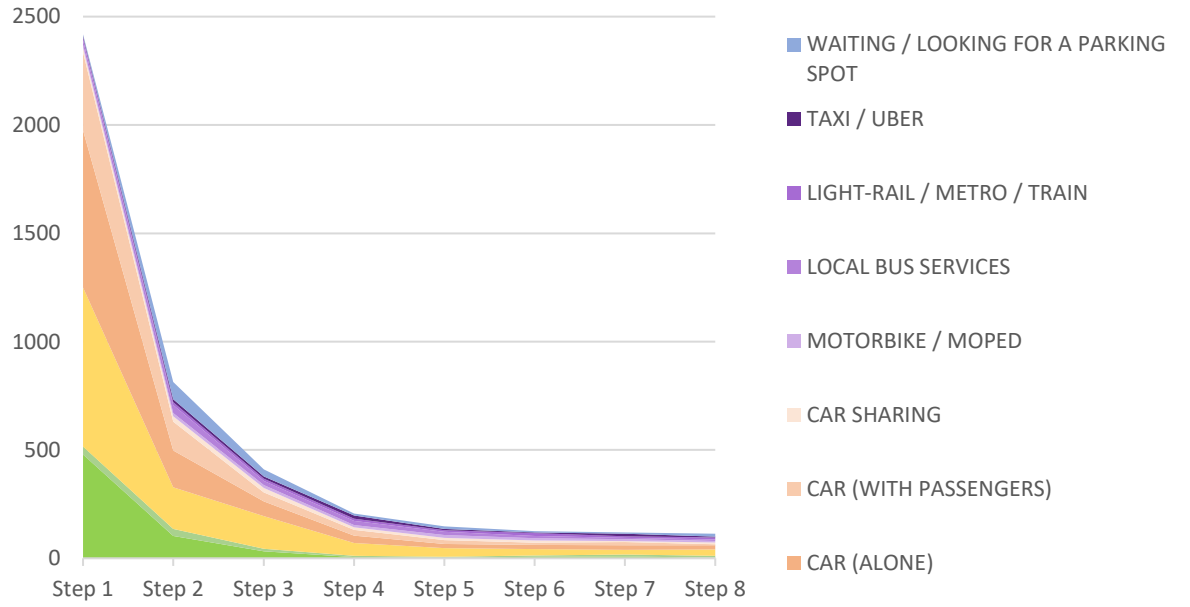


**Figure 38. Modes used during respondents' regular food shopping trip (*N* = 2418)**

As expected, respondents' regular food shopping trips were shorter on average compared to their regular (commute) trip. In particular, a greater proportion of respondents' regular (commute) trips involved two (*n* = 1400, 58%) or three steps (*n* = 914, 39%) compared to respondents' food shopping trips (two steps: n = 814, 37%; three steps: 411, 17%).

Indeed, in line with the above, most of respondents' food shopping trips were equal to or less than 5 miles (*n* = 1855, 78%), as is shown in **Figure 39**. These results also mirror the findings from questions about respondents' general car use [Section 2.1], indicating that most car drivers use their car for short trips (i.e., less than 6 miles or 10 kilometres, respectively) at least one a week (*n* = 1691, 93%), with the majority of respondents further reporting that food shopping is a primary purpose of these short trips (*n* = 1272, 70%).

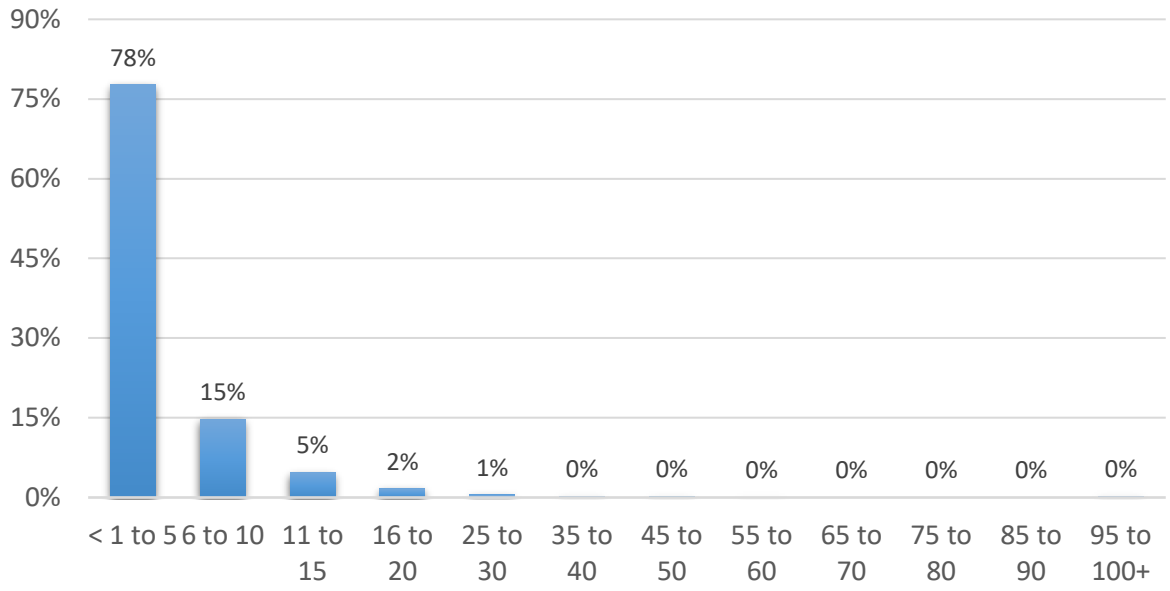


**Figure 39. Respondents' food shopping trip distances in kilometres (*N* = 2388)**

Similarly, respondents' food shopping trips were less frequent than their regular (commute) trip (see **Figure 40**), with the majority of survey respondents indicating that they went food shopping on either 1-2 days per week (*n* = 1333, 54%) or 3-4 days per week (*n* = 506, 21%).

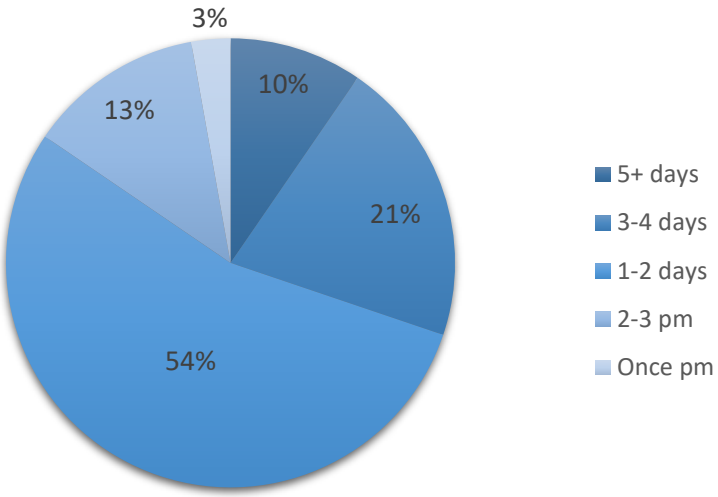


**Figure 40. Frequency of respondents' food shopping trip(s) (*N* = 2454)**

## 6.1. Simplified Stated Preferences (SP) for respondents' food shopping trip

As with respondents' regular (commute) trip, we asked respondents what alternatives, accessible from an eHUB, they would consider using for their regular food shopping trip, as is illustrated in **Figure 41**.

Again, the combined use of shared electric cars and public transport was broadly rejected (*n* = 1796, 76% would not use), possibly due to the shorter distance of food shopping trips compared to respondents' regular (commute) trip and the inconvenience of transporting goods on public transport. A similar picture emerged for the combined use of shared electric cargobikes and public transport (*n* = 1821, 77% would not use).

Yet, the results also suggested that a substantial proportion of respondents are willing to consider using shared cargobikes from an eHUB for at least a few food shopping trips (*n* = 1118, 46%). As much as 15% would even consider using shared cargobikes for most or all of their food shopping trips (*n* = 357). Similarly, 48% would consider using a shared electric car for at least a few food shopping trips (*n* = 1159), including 16% who indicated they might use a shared electric car from an eHUB for most or all of their trips (*n* = 404).

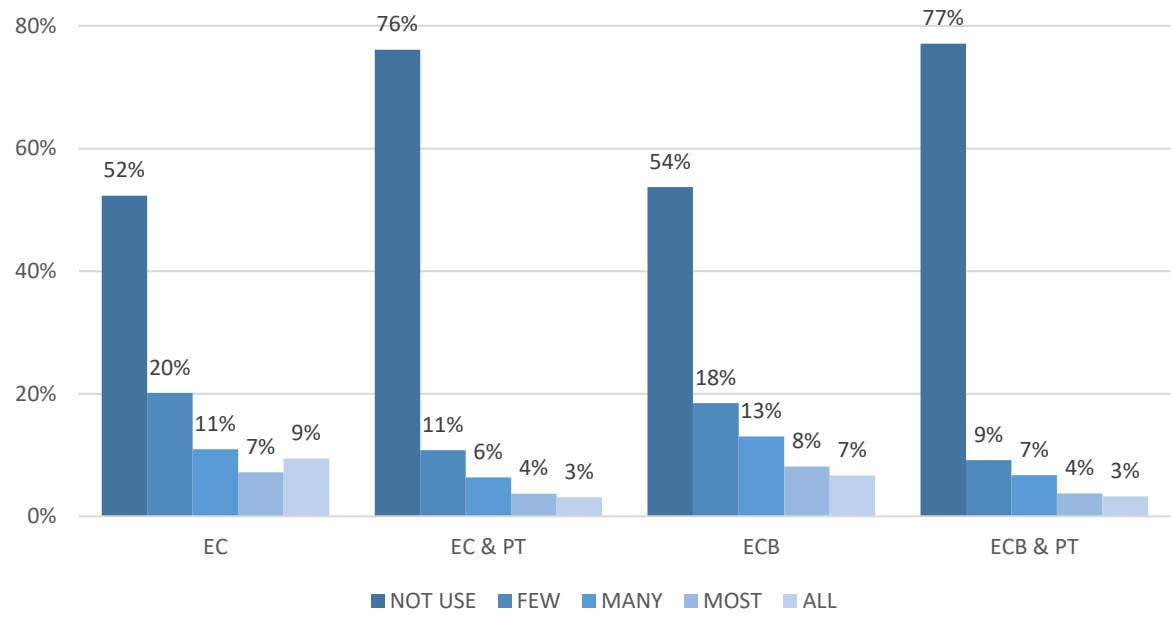


**Figure 41. Respondents' willingness to use shared vehicles from an eHUB for their regular food shopping trip(s) (EC = Electric Car, ECB = Electric Cargobike, PT = Public transport)**

Respondents' willingness to use eHUBS-based alternatives for their regular food shopping trip by city of residence are presented in **Table A14** in the appendix.

The contrast in the characteristics and frequency of food shopping compared to the commute trips clearly demonstrates the need to properly market and design the eHUB services. Worthy of note are the responses to the use of e-cargobikes, inviting further research to explore their use in more detail in future questionnaires.

As in Section 5.1, we compared the willingness to use eHUBS alternatives, here for people's regular food shopping trip(s), based on respondents' stated traveller identity. Mirroring the findings of Section 5.1, car drivers expressed a greater interest in using **shared electric cars** for food shopping trips (*n* = 532, 58%) compared to non-car groups (34-47%, see **Figure 42**).

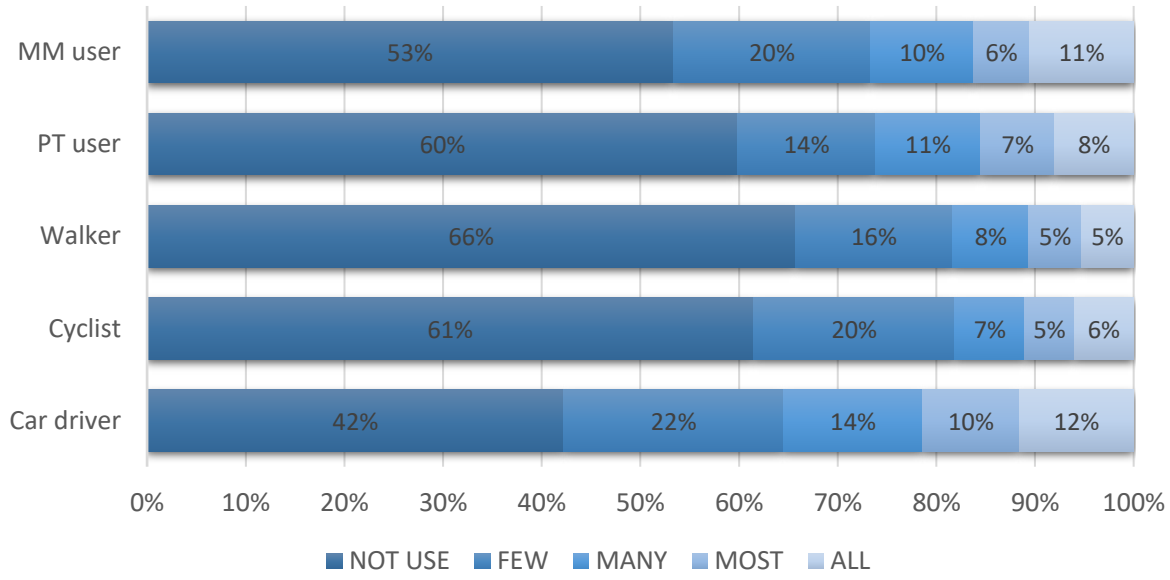


**Figure 42. Willingness to use shared electric car as a food shopping trip alternative by traveller identity (*N* = 2429)**

As is illustrated in **Figure 43**, cyclists (*n* = 244, 51%) and multimodal users (*n* = 319, 50%) showed the most interest in using **shared electric cargobikes** as a substitute for their current food shopping trip.

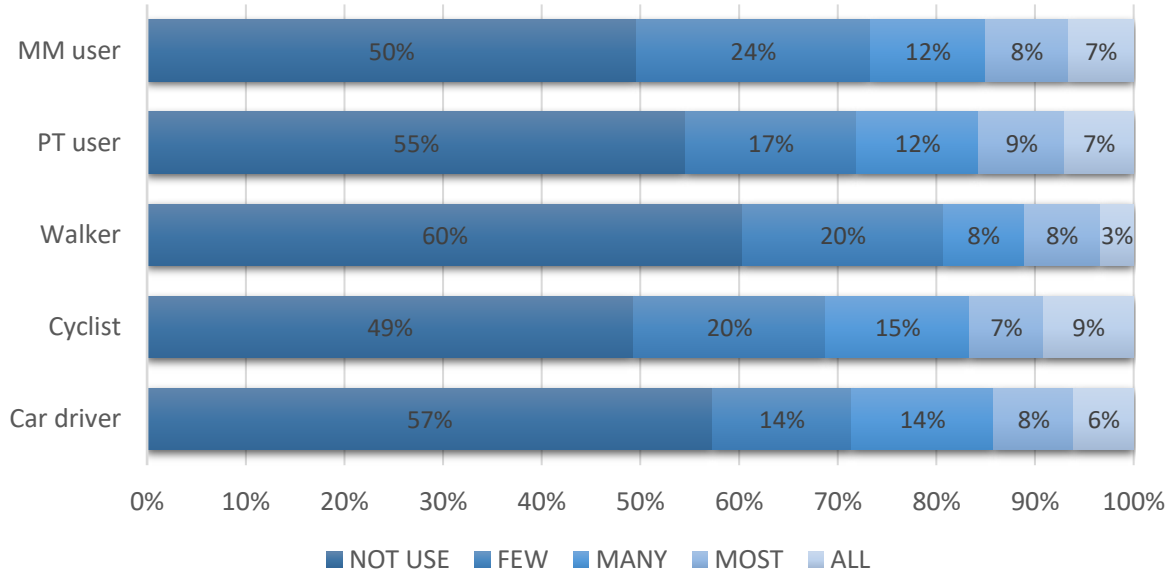


**Figure 43. Willingness to use shared electric cargobike as a food shopping trip alternative by traveller identity (*N* = 2415)**

# 7. ATTITUDES TOWARD SHARED MOBILITY, CAR USE AND THE ENVIRONMENT

In order to learn more about respondents' general attitudes towards shared mobility, car use and the environment, we challenged respondents with a series of twenty (20) pre-tested statements rated on a standard seven-point Likert-scale (Strongly disagree to Strongly agree). These statements along with the outcomes are displayed in **Figure 44**.

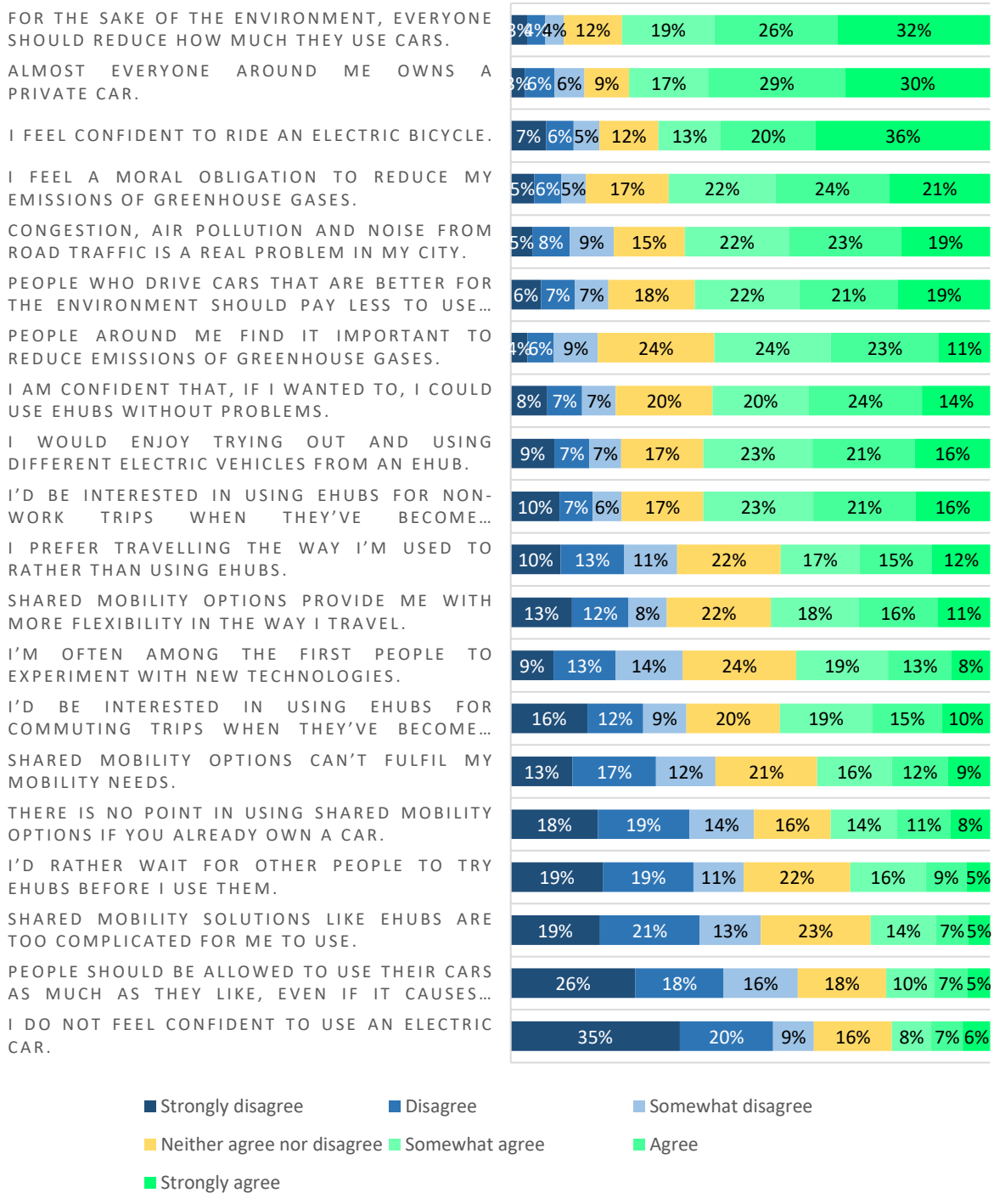


**Figure 44. Respondents' shared mobility and related attitudes (*N* = 2477-92)**

In general, most respondents held a **pro-environmental attitude**, agreeing with statements such as the necessity to reduce car use (*n* = 1908, 77% agree), feeling a moral obligation to reduce emissions (*n* = 1672, 67% agree), and being aware of environmental problems such as congestion, air pollution and noise from traffic (*n* = 1586, 64% agree).

Overall, respondents also held a **positive attitude towards shared mobility**. In particular, respondents felt confident to ride an electric bicycle (*n* = 1719, 69% agree), said they would enjoy trying out and using different electric vehicles from an eHUB (*n* = 1485, 60% agree), and indicated they would be interested in using shared vehicles from an eHUB for non-work-related trips (*n* = 1490, 60% agree).

However, the attitude statements also highlighted **barriers and negative attitudes** towards the use of shared vehicles. For instance, a substantial proportion of respondents indicated that shared mobility cannot fulfil their mobility needs (*n* = 896, 37% agree), that there is no point in using shared mobility if already owning a car (*n* = 826, 33% agree), that eHUBS are too complicated for them to use (*n* = 618, 26% agree), or that they do not feel confident using a shared electric car (*n* = 509, 21% agree).

These findings illustrate that there is support for novel eHUB facilities among the general population, yet they also highlight barriers to uptake that are likely to require more strategic policies, such as decreasing car parking in city centres, incentives to reduce the benefits of car ownership, or even aspirations for car-free cities.

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# APPENDIX

### Table A1. Age distribution by gender for each city of residence (*N* = 2015)

| Age | | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|---|
| 18-24 | Male | 0 / 5 | 35 | 29 | 16 | 15 | 24 | 119 |
| | Female | 1 / 6 | 30 | 23 | 10 | 18 | 35 | 116 |
| 25-34 | Male | 8 / 27 | 59 | 30 | 49 | 31 | 49 | 218 |
| | Female | 8 / 28 | 56 | 29 | 30 | 48 | 48 | 211 |
| 35-44 | Male | 6 / 17 | 40 | 30 | 38 | 49 | 37 | 194 |
| | Female | 10 / 24 | 31 | 48 | 31 | 48 | 30 | 188 |
| 45-54 | Male | 5 / 26 | 41 | 14 | 37 | 34 | 29 | 155 |
| | Female | 6 / 31 | 32 | 20 | 25 | 39 | 29 | 145 |
| 55-64 | Male | 5 / 16 | 33 | 10 | 30 | 39 | 19 | 131 |
| | Female | 1 / 12 | 31 | 9 | 13 | 24 | 21 | 98 |
| 65-74 | Male | - / 16 | 23 | 2 | 13 | 31 | 15 | 84 |
| | Female | - / 4 | 20 | 2 | 2 | 19 | 13 | 56 |
| > 75 | Male | - / 2 | 6 | 1 | 4 | 3 | 7 | 21 |
| | Female | - / 0 | 4 | 0 | 0 | 3 | 8 | 15 |
| Total | Male | 24 / 109 | 237 | 116 | 187 | 202 | 180 | 1055 |
| | Female | 26 / 105 | 204 | 131 | 111 | 199 | 184 | 960 |

### Table A2. Number of adults per household by city of residence (*N* = 1771)

| # Adults | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| 1 | 15 / 67 | 183 | 63 | 74 | 137 | 100 | 557 |
| 2 | 31 / 122 | 194 | 117 | 171 | 194 | 184 | 860 |
| 3 | 3 / 9 | 37 | 34 | 33 | 39 | 44 | 187 |
| 4 | 0 / 11 | 24 | 18 | 19 | 24 | 23 | 108 |
| 5+ | 1 / 6 | 16 | 14 | 3 | 11 | 15 | 59 |
| Total | 50 / 214 | 454 | 246 | 300 | 405 | 366 | 1771 |

### Table A3. Number of children per household by city of residence (*N* = 1379)

| # Children | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| 0 | 12 / 81 | 232 | 43 | 97 | 168 | 196 | 736 |
| 1 | 10 / 29 | 75 | 13 | 41 | 54 | 67 | 250 |
| 2 | 12 / 29 | 49 | 63 | 50 | 42 | 63 | 267 |
| 3 | 1 / 4 | 11 | 29 | 8 | 31 | 8 | 87 |
| 4 | 0 / 0 | 3 | 11 | 0 | 4 | 1 | 19 |
| 5+ | 1 / 2 | 7 | 7 | 1 | 2 | 3 | 20 |
| Total | 36 / 145 | 377 | 166 | 197 | 301 | 338 | 1379 |

### Table A4. Education level by city of residence (*N* = 2058)

| Education | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| No school | 0 / 1 | 5 | 2 | 0 | 1 | 3 | 12 |
| Primary school | 1 / 1 | 13 | 5 | 2 | 6 | 5 | 33 |
| Secondary school | 2 / 14 | 83 | 32 | 21 | 59 | 139 | 350 |
| Professional qualification | 10 / 17 | 94 | 20 | 73 | 5 | 38 | 257 |
| Undergraduate degree | 16 / 88 | 91 | 23 | 75 | 113 | 123 | 529 |
| Postgraduate degree | 19 / 91 | 170 | 145 | 125 | 217 | 54 | 821 |
| Prefer not to say | 2 / 5 | 8 | 26 | 7 | 3 | 5 | 56 |
| Total | 50 / 217 | 464 | 253 | 303 | 404 | 367 | 2058 |

## Table A5. Respondents' annual household income by city of residence

| Income | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| <£20,000 | 3 / 38 | 71 | 70 | 28 | 36 | 87 | 333 |
| £20,000-£39,999 | 10 / 63 | 119 | 83 | 55 | 100 | 122 | 552 |
| £40,000-£59,999 | 15 / 45 | 92 | 30 | 71 | 92 | 72 | 417 |
| £60,000-£79,999 | 9 / 24 | 54 | 7 | 46 | 58 | 32 | 230 |
| £80,000-£99,999 | 5 / 6 | 46 | 2 | 15 | 26 | 11 | 111 |
| >£100,000 | 2 / 7 | 22 | 0 | 15 | 15 | 18 | 79 |
| Prefer not to say | 6 / 34 | 62 | 63 | 72 | 75 | 26 | 338 |
| Total | 50 / 217 | 466 | 255 | 302 | 402 | 368 | 2060 |

## Table A6. Respondents' employment status by city of residence

| Income | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| FT employed | 30 / 81 | 181 | 141 | 163 | 214 | 152 | 962 |
| PT employed | 12 / 55 | 69 | 23 | 46 | 55 | 36 | 296 |
| Retired from work | 0 / 15 | 52 | 6 | 23 | 61 | 50 | 207 |
| Self-employed | 1 / 25 | 42 | 8 | 28 | 18 | 19 | 141 |
| FT student | 1 / 13 | 34 | 21 | 20 | 26 | 20 | 135 |
| Unemployed | 2 / 6 | 21 | 22 | 1 | 7 | 36 | 95 |
| Home/family | 1 / 3 | 8 | 4 | 7 | 6 | 20 | 49 |
| Secondary school | 0 / 0 | 8 | 14 | 3 | 1 | 6 | 32 |
| PT student | 0 / 2 | 7 | 1 | 2 | 2 | 7 | 21 |
| Apprentice/Trainee | 1 / 1 | 2 | 8 | 2 | 0 | 7 | 21 |
| Other | 2 / 9 | 13 | 5 | 4 | 9 | 5 | 47 |
| Total | 50 / 210 | 437 | 253 | 299 | 399 | 358 | 2006 |

## Table A7. Availability of household vehicles by city of residence

| Vehicle | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| Cars | | | | | | | |
| 0 | 11 / 59 | 149 | 26 | 26 | 117 | 53 | 441 |
| 1 | 31 / 112 | 244 | 92 | 136 | 204 | 227 | 1046 |
| 2 | 7 / 30 | 56 | 95 | 95 | 62 | 72 | 417 |
| 3+ | - / - | 7 | 21 | 32 | 11 | 15 | 86 |
| Total | 49 / 201 | 456 | 234 | 289 | 394 | 367 | 1990 |
| Bicycles | | | | | | | |
| 0 | 1 / 3 | 42 | 47 | 17 | 33 | 164 | 307 |
| 1 | 8 / 48 | 153 | 55 | 31 | 75 | 100 | 470 |
| 2 | 15 / 55 | 120 | 48 | 88 | 100 | 52 | 478 |
| 3+ | 24 / 107 | 133 | 74 | 158 | 192 | 34 | 722 |
| Total | 48 / 213 | 448 | 224 | 284 | 400 | 350 | 1967 |
| Cargo-bikes | | | | | | | |
| 0 | 29 / 155 | 332 | 189 | 216 | 306 | 320 | 1547 |
| 1 | 4 / 13 | 106 | 4 | 12 | 37 | 19 | 195 |
| 2 | - / 2 | 14 | - | 2 | 5 | 2 | 25 |
| 3+ | 1 / 2 | 6 | 4 | 3 | 1 | 3 | 20 |
| Total | 34 / 172 | 425 | 197 | 233 | 349 | 344 | 1754 |
| Motorbikes | | | | | | | |
| 0 | 28 / 148 | 309 | 166 | 184 | 313 | 310 | 1458 |
| 1 | 5 / 22 | 106 | 27 | 50 | 26 | 31 | 267 |
| 2 | 1 / 4 | 14 | 7 | 9 | 7 | 4 | 46 |
| 3+ | 1 / 2 | 6 | 5 | 5 | 3 | 4 | 26 |
| Total | 35 / 176 | 435 | 205 | 248 | 349 | 349 | 1797 |

## Table A8. Respondents' general use of the private car (*N* = 50-465; *< 6mi/10km)

| Variable | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| **License (L)** | | | | | | | |
| Yes | 47 / 198 | 392 | 208 | 298 | 358 | 303 | 1804 |
| No | 3 / 18 | 73 | 47 | 5 | 47 | 64 | 257 |
| L + >= 1 car | 36 / 142 | 296 | 199 | 265 | 258 | 289 | 1485 |
| **Car type** | | | | | | | |
| Petrol | 29 / 100 | 188 | 49 | 133 | 125 | 181 | 805 |
| Diesel | 5 / 19 | 54 | 135 | 109 | 116 | 87 | 525 |
| Hybrid | - / 11 | 24 | 7 | 8 | 16 | 14 | 80 |
| Electric | 3 / 6 | 25 | 2 | 7 | - | 4 | 47 |
| Other | - / 4 | 6 | - | 4 | 2 | - | 16 |
| **Role** | | | | | | | |
| Driver | 26 / 85 | 224 | 140 | 171 | 172 | 219 | 1037 |
| Passenger | 2 / 11 | 27 | 7 | 7 | 24 | 16 | 94 |
| Switching | 9 / 45 | 45 | 46 | 83 | 63 | 50 | 341 |
| **Passengers** | | | | | | | |
| 0 | 12 / 45 | 80 | 47 | 98 | 77 | 82 | 441 |
| 1 | 11 / 68 | 112 | 49 | 102 | 111 | 126 | 579 |
| 2+ | 14 / 28 | 105 | 97 | 61 | 69 | 78 | 452 |
| **Short trip*** | | | | | | | |
| Never | 2 / 15 | 23 | 8 | 11 | 30 | 7 | 96 |
| Once/week | 6 / 40 | 65 | 20 | 73 | 110 | 37 | 351 |
| 2-3 times | 12 / 52 | 72 | 34 | 74 | 70 | 80 | 394 |
| 4-5 times | 8 / 19 | 83 | 36 | 38 | 27 | 85 | 296 |
| >= 6 times | 8 / 14 | 51 | 95 | 65 | 20 | 77 | 330 |
| **Purpose** | | | | | | | |
| Commuting | 16 / 36 | 128 | 129 | 123 | 47 | 136 | 615 |
| Groceries | 28 / 98 | 161 | 153 | 182 | 189 | 231 | 1042 |
| Shopping | 5 / 32 | 113 | 62 | 90 | 73 | 145 | 520 |
| Visiting | 18 / 66 | 162 | 95 | 115 | 118 | 151 | 725 |
| Sports | 14 / 46 | 87 | 63 | 89 | 58 | 64 | 422 |
| Going out | 3 / 7 | 57 | 40 | 35 | 11 | 33 | 186 |
| Other | 1 / 19 | 21 | 20 | 34 | 31 | 16 | 142 |

**Table A9. Means and standard deviations of car use and alternatives attitudes by city of residence (1 – Strongly disagree to 7 – Strongly agree; *includes 'Other')**

| Attitude statement | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total* |
|---|---|---|---|---|---|---|---|
| Many of the journeys that I now make by car I could just as easily cycle. | 3.67 / 3.28 (1.77 / 1.88) | 3.71 (1.76) | 3.64 (1.92) | 3.62 (1.92) | 2.83 (1.77) | 3.55 (1.85) | 3.35 (1.88) |
| Many of the journeys that I now make by car I could just as easily do by using public transport. | 3.14 / 2.59 (1.66 / 1.55) | 3.70 (1.72) | 2.96 (1.84) | 2.74 (1.67) | 2.34 (1.47) | 3.51 (1.85) | 2.92 (1.76) |
| Many of the journeys that I now make by car I could just as easily walk. | 1.83 / 2.01 (1.34 / 1.38) | 3.11 (1.81) | 2.85 (1.87) | 2.38 (1.58) | 1.82 (1.32) | 3.42 (1.83) | 2.54 (1.72) |
| I am not the kind of person who rides a bicycle. | 3.06 / 2.20 (2.06 / 1.71) | 3.36 (1.96) | 3.18 (1.95) | 2.42 (1.93) | 2.33 (1.81) | 4.17 (2.01) | 2.95 (2.03) |
| There is no point in reducing my car use to help the environment unless others do the same. | 3.08 / 2.29 (2.09 / 1.54) | 3.66 (1.72) | 2.81 (1.88) | 2.17 (1.69) | 2.51 (1.64) | 3.63 (1.73) | 2.83 (1.82) |
| People around me (my family, friends and/or colleagues) encourage me to reduce my car use. | 2.31 / 2.68 (1.56 / 1.54) | 3.31 (1.74) | 3.22 (1.84) | 2.84 (1.78) | 3.00 (1.64) | 3.20 (1.74) | 2.99 (1.74) |
| I am willing to reduce the amount I travel by car. | 4.53 / 4.50 (1.93 / 1.84) | 4.28 (1.69) | 4.77 (1.62) | 5.14 (1.84) | 4.30 (1.91) | 4.40 (1.61) | 4.59 (1.78) |
| Next time I buy a car, I would consider buying a car with lower CO2 emissions. | 4.69 / 5.49 (2.04 / 1.60) | 4.72 (1.65) | 5.40 (1.47) | 5.54 (1.80) | 5.46 (1.45) | 5.16 (1.49) | 5.27 (1.66) |

## Table A10. Respondents' general travel behaviour by city of residence

| Mode | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| **Days PMT** | | | | | | | |
| 5+ pw | 11 / 31 | 49 | 142 | 108 | 44 | 101 | 486 |
| 3-4 pw | 10 / 36 | 84 | 31 | 54 | 38 | 80 | 333 |
| 1-2 pw | 14 / 47 | 102 | 24 | 86 | 126 | 82 | 481 |
| 2-3 pm | 5 / 36 | 64 | 9 | 34 | 86 | 28 | 262 |
| < 1 pm | 9 / 44 | 61 | 10 | 16 | 64 | 17 | 221 |
| Never | 1 / 22 | 105 | 38 | 3 | 43 | 59 | 271 |
| Total | 50 / 216 | 465 | 254 | 301 | 401 | 367 | 2054 |
| **Days Walk** | | | | | | | |
| 5+ pw | 17 / 78 | 134 | 76 | 93 | 137 | 78 | 613 |
| 3-4 pw | 8 / 45 | 99 | 32 | 65 | 83 | 54 | 386 |
| 1-2 pw | 14 / 53 | 102 | 34 | 77 | 82 | 79 | 441 |
| 2-3 pm | 3 / 15 | 59 | 27 | 36 | 40 | 49 | 229 |
| < 1 pm | 5 / 15 | 33 | 28 | 17 | 35 | 32 | 165 |
| Never | 3 / 10 | 39 | 58 | 12 | 27 | 75 | 224 |
| Total | 50 / 216 | 466 | 255 | 300 | 404 | 367 | 2058 |
| **Days Cycle** | | | | | | | |
| 5+ pw | 15 / 94 | 110 | 16 | 70 | 194 | 17 | 516 |
| 3-4 pw | 12 / 51 | 92 | 10 | 46 | 60 | 28 | 299 |
| 1-2 pw | 9 / 34 | 88 | 19 | 68 | 63 | 45 | 326 |
| 2-3 pm | 10 / 16 | 49 | 14 | 44 | 17 | 36 | 186 |
| < 1 pm | 3 / 11 | 46 | 37 | 42 | 20 | 34 | 193 |
| Never | 1 / 11 | 80 | 159 | 29 | 50 | 207 | 537 |
| Total | 50 / 217 | 465 | 255 | 299 | 404 | 367 | 2057 |
| **Days PT** | | | | | | | |
| 5+ pw | 2 / 9 | 58 | 32 | 10 | 45 | 26 | 182 |
| 3-4 pw | 7 / 30 | 82 | 7 | 12 | 56 | 37 | 231 |
| 1-2 pw | 5 / 33 | 103 | 13 | 19 | 45 | 47 | 265 |
| 2-3 pm | 8 / 43 | 91 | 9 | 48 | 90 | 50 | 339 |
| < 1 pm | 14 / 80 | 77 | 23 | 138 | 126 | 82 | 540 |
| Never | 14 / 22 | 54 | 171 | 72 | 41 | 125 | 499 |
| Total | 50 / 217 | 465 | 255 | 299 | 403 | 367 | 2056 |

**Table A11. Respondents' public transport pass ownership and traveller identity, as well as respondents' shared mobility use and intentions (*includes 'Other')**

| Variable | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| **Owning** | | | | | | | |
| PT pass | 38 / 168 | 324 | 45 | 30 | 116 | 113 | 834 |
| Rail card | 22 / 84 | 204 | 27 | 79 | 132 | 69 | 617 |
| None | 9 / 27 | 96 | 186 | 190 | 185 | 219 | 912 |
| Other | 2 / 2 | 7 | 4 | 17 | 37 | 3 | 72 |
| **Identity** | | | | | | | |
| Car driver | 16 / 36 | 162 | 156 | 101 | 62 | 216 | 749 |
| Cyclist | 13 / 76 | 111 | 11 | 55 | 153 | 14 | 433 |
| Walker | 1 / 11 | 44 | 28 | 19 | 27 | 55 | 185 |
| PT user | 2 / 12 | 57 | 19 | 7 | 26 | 37 | 160 |
| MM user | 18 / 82 | 92 | 41 | 120 | 137 | 46 | 536 |
| **Shared use** | | | | | | | |
| Not using | 34 / 152 | 308 | 221 | 240 | 288 | 297 | 1540 |
| Shared car | 7 / 31 | 95 | 8 | 33 | 85 | 35 | 294 |
| Shared bike | 11 / 31 | 70 | 8 | 15 | 29 | 37 | 201 |
| E-scooters | 4 / 5 | 34 | 17 | 12 | 4 | 17 | 93 |
| Other | 2 / 9 | 7 | 5 | 14 | 16 | 2 | 55 |
| **Intention** | | | | | | | |
| e-bike | 67.96 / | | | | | | |
| Mean | 51.56 | 53.08 | 65.29 | 52.30 | 43.32 | 47.48 | 51.19* |
| Median | 77 / 59.5 | 61 | 73 | 61 | 40 | 56.5 | 60 |
| e-car | 57.82 / | | | | | | |
| Mean | 59.22 | 56.73 | 60.55 | 58.34 | 48.20 | 54.63 | 55.24* |
| Median | 65.5 / 70 | 64 | 70 | 70 | 55 | 62 | 63 |
| e-cargo | 43.17 / | | | | | | |
| Mean | 60.33 | 62.33 | 49.10 | 46.63 | 31.56 | 41.03 | 42.52* |
| Median | 41.5 / 69 | 68 | 50 | 50 | 21 | 40.5 | 40 |
| e-scooter | 39.00 / | | | | | | |
| Mean | 69.33 | 72.33 | 55.13 | 43.18 | 32.17 | 41.02 | 44.55* |
| Median | 25 / 71 | 66 | 61 | 33.5 | 19 | 39 | 43 |

## Table A12. Perceived barriers to the use of shared vehicles by city of residence

| Barrier | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| Satisfied with own car/bike | 17 / 90 | 170 | 107 | 134 | 196 | 140 | 854 |
| Concerns about availability | 12 / 44 | 72 | 62 | 73 | 88 | 62 | 413 |
| Shared vehicle location is too far from me | 15 / 27 | 51 | 53 | 119 | 68 | 53 | 386 |
| Too expensive | 10 / 49 | 79 | 37 | 51 | 70 | 75 | 371 |
| I cannot leave the vehicles where I want | 11 / 31 | 46 | 41 | 86 | 60 | 43 | 318 |
| Prefer to use existing PT | 6 / 30 | 82 | 26 | 22 | 60 | 47 | 273 |
| Hard to reserve/ pick up vehicles | 5 / 18 | 42 | 21 | 67 | 57 | 22 | 232 |
| Haven't heard of it/I'm not aware | 5 / 22 | 22 | 51 | 32 | 8 | 66 | 206 |
| I do not feel safe to use shared vehicles | - / 5 | 29 | 29 | 15 | 15 | 70 | 163 |
| I do not see the added value of shared mobility | 1 / 10 | 41 | 11 | 19 | 31 | 30 | 143 |
| Hard to register/ pay for vehicles | 3 / 9 | 17 | 15 | 39 | 40 | 15 | 138 |
| Shared vehicles are badly maintained/dirty | - / 7 | 21 | 33 | 22 | 12 | 37 | 132 |
| Travel data/ privacy concerns | - / 5 | 32 | 11 | 21 | 19 | 24 | 112 |
| Other (please specify) | 6 / 35 | 17 | 17 | 38 | 56 | 17 | 186 |

**Table A13. Respondents' willingness to use shared electric vehicles from an eHUB for their regular (commute) trip**

| Willingness | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| **Electric car** | | | | | | | |
| Would not use | 22 / 125 | 212 | 81 | 126 | 291 | 159 | 1016 |
| For a few trips | 16 / 40 | 117 | 90 | 79 | 56 | 74 | 472 |
| For many trips | 4 / 16 | 49 | 37 | 24 | 15 | 57 | 202 |
| For most trips | 2 / 17 | 54 | 18 | 22 | 16 | 38 | 167 |
| For all trips | 4 / 16 | 29 | 22 | 35 | 16 | 36 | 158 |
| **Electric bike** | | | | | | | |
| Would not use | 17 / 107 | 195 | 97 | 144 | 214 | 198 | 972 |
| For a few trips | 11 / 54 | 77 | 77 | 54 | 88 | 58 | 419 |
| For many trips | 8 / 19 | 92 | 39 | 38 | 44 | 57 | 297 |
| For most trips | 9 / 12 | 65 | 18 | 23 | 24 | 35 | 186 |
| For all trips | 5 / 19 | 27 | 18 | 26 | 23 | 15 | 133 |
| **Electric car + Public transport** | | | | | | | |
| Would not use | 31 / 159 | 238 | 129 | 200 | 338 | 191 | 1286 |
| For a few trips | 8 / 27 | 81 | 61 | 34 | 25 | 64 | 300 |
| For many trips | 4 / 11 | 76 | 26 | 16 | 13 | 51 | 197 |
| For most trips | 3 / 3 | 40 | 7 | 5 | 7 | 37 | 102 |
| For all trips | 1 / 6 | 25 | 15 | 7 | 4 | 18 | 76 |
| **Electric bike + Public transport** | | | | | | | |
| Would not use | 25 / 153 | 208 | 139 | 202 | 288 | 216 | 1231 |
| For a few trips | 9 / 29 | 79 | 59 | 31 | 46 | 50 | 303 |
| For many trips | 7 / 14 | 85 | 22 | 14 | 32 | 50 | 224 |
| For most trips | 4 / 7 | 54 | 10 | 7 | 14 | 35 | 131 |
| For all trips | 4 / 4 | 29 | 15 | 15 | 7 | 11 | 85 |

**Table A14. Respondents' willingness to use shared electric vehicles from an eHUB for their regular food shopping trip**

| Willingness | ARN/NIJ | AMS | DRE | KEM | LEU | MAN | Total |
|---|---|---|---|---|---|---|---|
| **Electric car** | | | | | | | |
| Would not use | 23 / 141 | 261 | 88 | 113 | 239 | 186 | 1051 |
| For a few trips | 13 / 37 | 82 | 76 | 62 | 82 | 61 | 413 |
| For many trips | 7 / 11 | 61 | 36 | 45 | 24 | 37 | 221 |
| For most trips | 4 / 8 | 30 | 19 | 27 | 23 | 36 | 147 |
| For all trips | 3 / 14 | 25 | 29 | 41 | 29 | 43 | 184 |
| **Electric cargobike** | | | | | | | |
| Would not use | 21 / 129 | 239 | 124 | 112 | 204 | 225 | 1054 |
| For a few trips | 11 / 26 | 74 | 65 | 73 | 76 | 43 | 368 |
| For many trips | 7 / 28 | 78 | 19 | 39 | 55 | 51 | 277 |
| For most trips | 7 / 13 | 41 | 14 | 37 | 24 | 31 | 167 |
| For all trips | 4 / 13 | 23 | 22 | 28 | 36 | 13 | 139 |
| **Electric car + Public transport** | | | | | | | |
| Would not use | 39 / 183 | 279 | 151 | 223 | 359 | 236 | 1470 |
| For a few trips | 6 / 12 | 70 | 42 | 24 | 14 | 50 | 218 |
| For many trips | 3 / 4 | 61 | 20 | 5 | 6 | 34 | 133 |
| For most trips | 1 / 3 | 27 | 8 | 5 | 4 | 25 | 73 |
| For all trips | 1 / 3 | 19 | 18 | 5 | 3 | 17 | 66 |
| **Electric cargobike + Public transport** | | | | | | | |
| Would not use | 43 / 180 | 275 | 160 | 223 | 355 | 248 | 1484 |
| For a few trips | 1 / 8 | 59 | 45 | 22 | 17 | 32 | 184 |
| For many trips | 2 / 11 | 60 | 17 | 7 | 7 | 40 | 144 |
| For most trips | 3 / 2 | 38 | 6 | 6 | 4 | 20 | 79 |
| For all trips | 1 / 4 | 23 | 14 | 8 | 2 | 17 | 69 |