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Moving to Private-Car-Restricted and Mobility-Served Neighborhoods: The Unspectacular Workings of a Progressive Mobility Plan

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Abstract: Despite ongoing changes in housing construction around parking requirements, few studies have been undertaken on travel practice and vehicle ownership once homes have been built in line with new requirements and occupied. This study focused on the experience and travel practices of residents in two specific cases involving new requirements in Sweden. It was based on interviews and questionnaires with residents before and after they moved into the two new blocks of apartments. A relatively restricted supply of parking was compensated for with subsidized mobility services for the residents, e.g., car and bike (sharing) clubs. The results indicated a decrease in car ownership in both blocks, as well as a decrease in the frequency of car travel in one of them. There were indications that use of public transport had increased. Our analysis illustrates the roles that parking and mobility services played over time in establishing the residents' travel habits. The process that shaped the new residents' car ownership and travel patterns was, in part, quite slow and unspectacular compared with the intentions and expectations of the stakeholders involved as regards to how car ownership and travel habits would change. We discuss a spectrum of everyday life conditions, which together with parking requirements and mobility services can stimulate the growth of urban mobility practices other than those based on private car ownership.

Keywords: minimum parking requirement; flexible parking requirement; mobility; sustainable mobility; mobility services; mobility as a service; mobility practices; social practice theory; mobility biographies; inter-disciplinary; multi-method research

1. Introduction

To ensure the availability of car parking spaces in new housing, requirements for the creation of a certain amount of parking spots have commonly been used. These provisions were introduced and became institutionalized in many countries and cities in the second half of the 20th century [1]. One main argument for these so-called *minimum parking requirements* is that they prevent parked cars from competing for and taking up too much space on adjacent streets [2] and help to create ample parking for expected future car ownership [3]. They have increasingly been criticized for not taking the costs of building and maintaining parking into account [2], using too much space [4], making apartment construction more difficult [5], resulting in impermeable parking surfaces contributing to storm-water runoff as a source of water pollution and flooding [6], stimulating increased car use [7,8], and not necessarily achieving their intended effect of relieving crowded on-street parking [9], because if curb parking is free of charge or cheaper than off-street parking, residents may tend to park on the street anyway. American studies have identified that parking generally is an oversupplied resource in

several contexts including multi-family housing [10,11]. Furthermore, minimum parking requirements were developed at a time when the purpose of the city plans was to adapt cities to increased car use and car ownership [1]. Today, in most cities, this is no longer the objective of parking policies.

As a result of this criticism and a change in policy objectives, several cities have revised their residential parking policies. For instance, London changed its residential parking policy from minimum to maximum requirements in early 2000 [12]. Various other European cities have also run pilot projects with so-called low-car developments or car-free developments, where the number of car parking spaces is limited and other mobility services are provided (e.g., a car club or bicycle clubs) [13]. The European network EPOMM (European Platform on Mobility Management) has developed guidelines for "mobility management" in the building permit process [14] which are in line with low-car developments. These policy changes reflect broader paradigm shifts in transport planning which argue that the focus should move away from vehicles and traffic flows towards people, accessibility, and mobility [15].

This is a trend that is being followed by Swedish cities as well, with many of them recently changing their housing parking policies from minimum parking requirements to policies in line with low-car development ideas (lower and more context-specific standards with the possibility of substituting car parking spaces with other mobility services). These new guidelines have been termed *flexible parking requirements* in some cities and *green parking standards* in others. Behind these standards are municipal policy objectives for housing, transport, and land use. More specifically, the objectives include enabling cost-effective housing construction and facilitating the development process, making roads and streets more attractive places, reducing the need to travel, increasing the capacity for more people and goods to be transported on the existing road network, minimizing the negative effects of road and street traffic by steering car use to where it has the most benefit to society, and enabling residents who do not need a car every day to choose other more capacity-efficient means of transport (e.g., [16,17]). This paper focuses on the last two objectives, i.e., enabling residents to choose capacity-efficient means of transport and steering those who do not need to use a private car away from it.

The outcomes of new policies have been studied from a few different perspectives. Li and Guo [12] assessed how the change from minimum to maximum parking requirements has affected the number of parking spaces that were built in new housing in London. Foletta and Field [13] and Melia [18] measured travel habits and car ownerships in quite recently built neighborhoods in European cities that planned for low car ownership. However, there is a lack of studies on how the introduction of new forms of parking requirements shape residents' travel habits and related daily practices and possibly enable them to choose capacity-efficient means of transport. This study focused generally on the residents' mobility practices and specifically on the process of how residents changed their parking habits and used mobility services and how this affected car ownership. This paper was intended to fill the abovementioned research gap by means of a mixed methods study in which two developments were followed during the construction and inhabitation processes.

This paper reports on a study of progressive mobility plans implemented by two housing companies, supported by two municipalities, each of which built one new block of flats (2016–2018) to be run as homeowner associations (HOAs). Mobility services are a voluntary undertaking according to Swedish building regulations but still a condition when municipalities lower parking requirements for building permits in exchange for mobility packages; this is what took place in the two studied cases. The two HOAs were given building permits, requiring a comparatively low number of parking spaces, but with the developers guaranteeing the availability of a range of other mobility services (i.e., a car club, bicycle club with electric bikes and cargo bikes, subsidized taxis and rental cars, and free monthly passes on public transport) for up to five years. Our overall assessment of the outcome of the planning process and its implementation is that, at least initially, it seemed to have fulfilled its objectives. The mobility services were made available to residents, and there were fewer parking spaces than normal in the garages.

The specific results, regarding the experience and travel practices of residents, reported in this paper indicate that the interviewees—habitual users of public transport as well as car drivers—found the travel modes satisfactory for everyday use while car-drivers solved their parking situation. The vehicle clubs and subsidized rental cars were used by a slowly increasing number of residents. How the measures worked in the two HOAs (in separate suburbs of greater Stockholm) also showed informative contrasts. The results indicate a decrease in car ownership in both blocks of flats and a decrease in the frequency of car travel in the one blocks of flats located in Alvsjö (hereafter termed HOA Elvsjoe). The share of car travel was more stable in the other block, HOA Haninge. In our analysis we linked these differences to the age distribution of those who moved in and the initial differences in the charges (the parking facility was not finished in HOA Haninge at the time of the survey, it is expected to be finished by December 2019. Provisional parking spaces were available at a monthly cost of 500 SEK. When the parking facility is finished, the parking charges will increase to 1000 SEK per month). We also linked it to issues of applying the methods, i.e., to the shorter time that residents had lived in one HOA (Haninge) compared to the other (Elvsjoe) when answering the questionnaire (the survey was conducted two months after residents moved into HOA Haninge compared to 2-10 months in HOA Elvsjoe). Regarding parking, visitor parking also proved to be of relatively great importance to residents, which is in line with what other researchers have observed [19,20]. A crucial factor in planning and changing the travel habits of residents in the new dwellings was, as anticipated, the situation from a public transport point of view. The lesson learned was that such measures should continue to be carefully planned based on the role of local public transport nodes. With regard to lessons learned that go beyond the new homes studied and their owners, we argue that future measures of this kind could be made much more available to residents of adjacent properties, so that a wider range of mobility offers can be offered to the entire neighborhood, possibly even before the newly built properties are occupied. This could lead to early and increased visibility and use of mobility services, especially of vehicle clubs, for which we found that experience, skills, and know-how are still not widespread.

Our study with the residents started in 2016 when we made initial contact with people who had signed a contract with the housing companies to buy an apartment. Our intention, which has now been fulfilled, was to follow the buyers through the process of moving in and possibly re-shaping their travel practices. Particular attention was paid to understanding whether and how the mobility services provided were used and integrated into people's everyday lives. The specific research questions that directed the study were:

- How did previously relatively marginal practices among the population (e.g., vehicle clubs) develop when such services were made available and subsidized and households were informed about them in connection with buying and moving into the new flats?
- What might a process of leaving car-dependent practices behind look like in connection with the implementation of such measures? (In the wording of the City of Stockholm's Urban Mobility Strategy [12]: Have residents *"who needn't use a private car been steered away from it"*? Have residents been enabled to use *"capacity-efficient means of transport"*?)

The findings in this paper build on previous studies and theories about how practices recruit new members, are reproduced and maintained, and slowly disappear. Thus, the aim of this paper was to provide insights for the various actors involved on how best to design similar measures in the near future.

2. Materials and Methods

2.1. Analytical Framework

The way in which we collected and interpreted the data was guided by social practice theory (SPT), which means that the focus shifts from the individual to socially shared and collectively constructed

practices. Social practice theory is critical of individualistic and reductionist research methodologies and highlights how socially shared practices are constructed by people performing the practice.

This study used a multi-method approach to study people's mobility practices before and after moving into apartments that have fewer parking spaces but offer mobility services. The research was situated in a constructivist and interpretative research tradition, which means that we were interested in how the informants perceived and made sense of the measures in their daily life. Thus, the aim of this paper was to show how the mobility measures and other local circumstances were perceived and linked (or not linked) to residents' participation in certain mobility practices and other bundles of practices.

The approaches used were similar to a mobility biographies approach (e.g., [21]) insofar as people that changed houses were followed. The research team took into account that there are several factors influencing the choice of apartment, including travel options, when designing the study. Other factors are price, housing design, kinship, and other local social relationships as well as location in relation to employment. Therefore, in the interviews we asked open questions about why the informants choose to buy that particular apartment. We also asked open questions about the informants' knowledge about the mobility services and parking facilities. The idea behind this was to see whether the informants mentioned mobility services and parking during the main interview part about their (conditions for) daily travel. If not, direct questions regarding the knowledge of mobility services and parking were asked in the end of the interview (see [22] for more information about this). Two complementary methods of data collection were used here: semi-structured interviews and surveys. These methods are described below, followed by an explanation of how the cases were selected.

Online surveys were sent to all those who had bought an apartment in the studied blocks in two waves: one before they moved into the new apartments (pre-survey) and the second when they were living there (post-survey). Both surveys were conducted at the same time of year (October/November 2017 and 2018) in order to increase the comparability of the results. The objective of the surveys was to obtain information on vehicle ownership, parking, and travel patterns (i.e., the travel modes used in the day and week prior to the survey) before and after moving into the apartments and to assess the changes that had occurred. The questions regarding travel patterns were in the form of a travel diary. The respondents are asked to report the trips they had made and to fill in the travel modes used on each day of the previous week. Questions were also asked regarding access to cars and functioning bikes as well as the way in which they had access to a car (e.g., private, company or shared cars). The post-survey included additional questions on the mobility services provided (knowledge, self-reported use, and possible effects on travel habits after moving). The survey was also designed to collect background information about the residents-to-be for the purpose of selecting informants for the interviews (a travel diary with all the trips taken during the day prior to completing the survey was also included in the survey. The results from this travel diary are not included in the article due to the low reliability of the data.). The response rates for the surveys were as follows:

- Pre-survey: 26 out of 85 households answered the pre-survey in HOA Haninge and 70 out of 157 households in HOA Elvsjoe.
- Post-survey: 40 out of 85 households answered the post-survey in HOA Haninge and 87 out of 157 households in HOA Elvsjoe.
- Pre- and post-survey: 14 out of 85 households answered both the pre- and the post-survey in HOA Haninge and 32 out of 157 households in HOA Elvsjoe.

In the following, we refer to the residents who have answered both the pre- and post-survey as sample 1 and to all those who answered the post-survey as sample 2. Observe that everyone did not answered all the questions in the survey, and the total number of respondents was therefore lower for certain questions.

To complement the survey, data on the use of the mobility services were obtained from the mobility services providers.

Semi-structured interviews were carried out in two waves: before and after moving into the new apartments. In total, 23 interviews were conducted in HOA Elvsjoe and 15 in HOA Haninge. The purpose of the interviews was to understand residents' mobility practices and how the informants made sense of the everyday mobility conditions in which they found themselves. A new technology or service (for instance a car club) should be understood in terms of how these measures were appropriated by the informants—for instance, how they were linked to other practices that facilitated or constrained a change in practices. The purpose was also to understand how possible changes occurred, e.g., identifying the process of selling a car, how people adapt, where they park their cars, and how these decisions affect their daily life and perceptions of their residence. The semi-structured interviews allowed the informants to reflect on certain topics relatively freely. Open questions were posed, and the follow-up questions were adjusted depending on the informants' replies. As a consequence, the interviews went in different directions. Some questions changed order or were even omitted when deemed irrelevant. Additionally, a number of short interviews were conducted with selected informants in order to gain insight into specific matters or clarify replies in the survey (e.g., reasons for reducing car ownership). Various field visits, including observations and short interviews, were also made to the HOAs and information meetings. Furthermore, the developers were contacted to find out whether there were potential buyers who chose not to buy an apartment due to the relatively few numbers of parking spaces.

In research on the choice of housing and travel modes, the concept of self-selection bias (e.g., [23]) is often highlighted as a challenge. The question raised in this literature concerns whether residents' choice of housing location is due to the travel options available (i.e., whether they move to the new location because they want to change travel habits) or whether they change travel habits because they move to the new location. These studies have mainly used statistical causal relationships to generalize the results. This article recognized the challenge of self-selection bias, but approaches the issue from another epistemological standpoint. Several factors were seen as mutually constituent, but cause and effect relationship between isolated factors was not in focus. This means that analytical generalizations were used instead of statistical generalizations, i.e., that the generalizations were made on a more conceptual level, where findings were generalized by referring to theoretical concepts [24].

Our data, i.e., the (anonymized) interview transcripts and the questionnaire database, will be provided but access details are not yet available. These will be supplied prior to possible publication.

2.2. Study Area

The first HOA had 85 apartments and is located in the Haninge municipality (hereafter termed HOA Haninge). It is situated 20 km south of the Stockholm city center and well located in relation to urban facilities and public transport (the commuter train trip to the city center takes about 30 min). Residents were given access to the apartments in September 2018. The second, HOA Elvsjoe, has 157 small- and medium-sized apartments targeted at young people who are buying their first apartment. It is located 5 km south of the Stockholm city center next to the commuter train, from where a trip to the city center takes 10 min. In both HOAs, the mobility services included car clubs with electric cars offering discounts for the residents, bike clubs with electric (cargo) bikes, safe and easily accessible parking for personal bikes, information and financial incentives to use public transport, and (only) in HOA Haninge personal travel planning offered by a travel coach and discounts on taxis and an offsite car hire service.

3. Results

3.1. Access to Cars and Parking

The survey (fourteen people in HOA Haninge and 32 people in HOA Elvsjoe answered both the pre- and post-surveys) revealed that the respondents had access to fewer private cars (by *access to private cars*, we refer to both privately owned cars and company cars that can be used privately)

after moving to the new apartments. Residents moving to HOA Haninge reported having access to 14 private cars in the pre-survey and 10 cars in the post-survey. Residents moving to HOA Elvsjoe reported having access to 19 private cars before moving to the new apartments and 13 cars after the move. The results are summarized in Table 1.

Unit: Number of People	Access to a Car		Access to One Private Car		Access to Two or More Private Cars		Sum of Private Cars	
	Before	After	Before	After	Before	After	Before	After
HOA Haninge: sample 1 (pre- and post-survey) HOA Haninge: sample 2	12	12	9	11	2	0	14	10
(everyone in the post-survey)		33 out of 40		28 out of 40		2 out of 40		32
HOA Elvsjoe: sample 1 (pre- and post-survey)	21	17	10	7	4	3	19	13
HOA Elvsjoe: sample 2 (everyone in the post-survey)		51 out of 85		29 out of 83		4 out of 83		33

Table 1. Access to cars at homeowner association (HOA) Haninge and HOA Elvsjoe: pre- and post-survey.

These changes in car ownership were not necessarily due to the parking policy or to the provision of mobility services at the residencies. Several other changes had occurred in people's lives that may have affected car ownership (e.g., family situations and employment). In HOA Elvsjoe, six people went from having one or several private cars to having zero cars, two people went from having several cars to one car, and three respondents reported having more cars after they moved to HOA Elvsjoe. Both the surveys and the interviews indicated that many of the respondents who had less access to private cars had lived with their parents before moving to HOA Elvsjoe. They had access to their parents' car when living at home and did not acquire a private car when moving to HOA Elvsjoe. (Six out of the eight respondents who reported having reduced private car ownership moved from households with three or more adults to single households (three people) and to households with their parents. One of these informants (Informant 15) said that he would have bought a car if the parking charges had been lower.)

In HOA Haninge, the respondents who reported reduced car ownership in the post-survey (three out of 14 respondents) were older than those in HOA Elvsjoe. Two respondents were in the 55–64 age group and one was retired and over 65 years old. One person in this group came up with the idea of selling his car during an information event at which he was informed about the limited number of parking spaces (Informant 10, pre-interview). The other two households sold their second and third car. The explanatory factors were different, but, in both cases, they seem to be dependent on changes in people's everyday lives and on the parking supply/mobility services provided in the HOA.

There were 17 people on the waiting list for a parking space in HOA Haninge (as of 26 March 2019) and 35 on the waiting list for a parking space in HOA Elvsjoe (20 for a surface parking space and 15 for a garage space as at 23 May 2019. Note that some people may be on both waiting lists at the same time.).

People owning a car and on the waiting list for a parking space resolved their parking in different ways: some rented a parking space nearby (e.g., Informant 17), some parked at their parents' home (e.g., Informant 2) some parked on a street nearby (e.g., Informant 18), and some were on the waiting list for a parking space but did not own a car (e.g., Informant 14).

Another issue that came up during the interviews was parking spaces for visitors. Some people mentioned that it was hard for visitors to find parking spaces around the flats and that they thought this was problematic, even including people who did not own a car.

3.2. Use of Mobility Services

In this section, we describe how and to what extent residents used the mobility services provided. The use of bikes and related services turned out to be used relatively infrequently and will thus only be discussed briefly. This is followed by a more detailed presentation of results about the car services (club, rentals, etc.) and public transport.

The two mobility services for cycling were easily accessible and were theft-proof bicycle parking and bike clubs. However, it turned out that the proportion of journeys by bicycle was low in the group studied, both before and after moving in (see Section 3.3 incl. Figures 1–4, below). According to our survey, 10 people had used the electric bikes in the bicycle club and five had used the cargo bikes in HOA Elvsjoe (as of the end of October/early November 2018). The bike club in HOA Haninge was still not in place at the time of this study.

It is also worth mentioning that many residents did not have access to a functioning bike, especially in HOA Haninge. In HOA Elvsjoe, 34 out of 83 respondents in the post-questionnaire reported that they had access to a functioning bike, while 8 out 74 respondents had a broken bike. In HOA Haninge, 16 out of 39 had access to a functioning bike, and 9 out of 35 had a broken bike. In some cases, the informants reported that the bikes had been broken for several years and that they had intended to fix the bike but had never gotten around to it (e.g., Informant 7).

3.2.1. Use of Car-Related Services

A car club with two cars is provided at HOA Elvsjoe and everyone living in the HOA has free membership for five years (they only pay when they use the cars) but they themselves have to register for it. Between December 2017 and September 2018, there was one car in the car club which was parked underground in the garage. In September 2018, the car club was relocated to the surface parking area and a second car was added in October 2018. The car club is an open car club and membership is not restricted to residents of HOA Elvsjoe. Furthermore, residents in the HOA can use cars provided by the car club provider at other locations. The cars are booked through a digital reservation system. When registered to the car club, the residents can book a car via a mobile app and also use the app to unlock the cars.

The car club at HOA Haninge is organized differently. It consists of two electric cars, but the cars can only be booked by HOA Haninge residents. The users pay a fixed fee per hour. At the beginning, the fee was 69 SEK per hour, but on 1 March 2019 it was reduced to 49 SEK per hour. The car club provider also recruited an "ambassador" for the car club—a resident who uses the car club frequently and who can answer questions about it. Furthermore, the car club in HOA Haninge has a profit-sharing scheme, which means that the car club becomes less expensive for the HOA the more it is used. The cars are booked through a digital reservation system. When registered to the car club, residents can book a car via a mobile app.

Car club membership has increased considerably among residents of both HOA Elvsjoe and HOA Haninge. According to the surveys, one person was a member of a car club before moving to HOA Elvsjoe and 24 (out of 29 respondents) were members after moving in (thirty-one people answered both surveys, but only 29 answered this question in the pre-survey). Furthermore, the car club provider informed us that there were 70 people living in HOA Elvsjoe who were members of the car club (out of 157 apartments) and that 27 people had used the car club at least once (as of 10 May 2019). The number of car club members and users had increased over time. In October 2018, it had 59 members and 26 people had used it at least once. Furthermore, the post-survey showed that most people—16 out of 18—who had used the car club did not have access to a private car (data from the post-survey with 84 respondents).

The findings are summarized in Table 2. We used two samples (see Section 2.1.): The first was the participants in the study who answered the before-questionnaire, moved to the house, and then also answered the after-questionnaire, all in all 29 people in HOA Elvsjoe. We called this sample 1.

The second sample was everyone who moved to the house and answered the post-survey, regardless of whether they answered the pre-survey or not, 84 people in HOA Elvsjoe. We refer to them as sample 2.

Unit: Number of People	Sample 1 from the Survey		Sample 2 fro	m the Survey	Data from the Car Club Providers		
	Members before moving Oct/Nov 2017	Members after moving in Oct/Nov 2018	Users of the car club Oct/Nov 2018	Users of the car club who did not have a private car Oct/Nov 2018	Users of the car club Spring 2019	Members of the car club Spring 2019	
HOA Elvsjoe	1 out of 29	24 out of 29	18 out of 84	16 out of 18	27	70	
HOA Haninge	0	8 out of 13	4 out of 40	2 out of 4	11	32	

Table 2. Membership and users of car clubs prior to and after moving into the flats.

The number of car club bookings is presented in Figure 1. According to the car club provider, 175 people living outside HOA Elvsjoe had booked a car in HOA Elvsjoe's car club at least once. Of these 175 people, 103 became members of the car club after it was set-up. People outside HOA Elvsjoe had booked the car club 507 times, and residents of HOA Elvsjoe had booked it 431 times. Furthermore, HOA Elvsjoe residents booked a car club outside HOA Elvsjoe 13 times.



Figure 1. Number of bookings per month through the car club at HOA Elvsjoe.

For residents moving to HOA Haninge, none of the 14 people who answered both surveys were a member of a car club in the pre-survey, while 8 out of 13 people were in the post-survey. The car club provider informed us that the car club had 32 members (as of 30 June 2019) and that 11 people had used it (as of 28 March 2019). According to the post-survey, four out of 40 people had used the car club at least once—two of these did not own a car and two did. The car club was booked 187 times between September 2018 and June 2019.





3.2.2. Use of Public Transport

Residents who were not renting a parking space or who were not on a waiting list for a parking space received a one-year public transport card for free when they moved into HOA Elvsjoe. Before moving there, 20 (out of 30 respondents) had access to public transport. In the post-survey, 25 people (out of 32) had access to a period card. Most people with a period public transport card did not own a car (19 out of 25), and most without a public transport card owned a car (5 out of 7) in the post-survey. At the same time, 17 people (out of 29 respondents) had a pay-as-you-go card in the pre-survey compared to 12 (out of 30) in the post-survey.

The offer was different in HOA Haninge. Everyone moving into HOA Haninge received a free public transport card for one month, or the equivalent amount as a pay-as-you-go card. Among residents moving to HOA Haninge, six people (out of 14 respondents) had a period public transport card in the pre-survey and seven (out of 13 respondents) did in the post-survey. Six out of 13 people had a pay-as-you-go card in the pre-survey and six (out of 12) did in the post-survey.

3.3. Travel Patterns and Daily Activities

The travel dairy indicated that HOA Elvsjoe residents used their cars on fewer days of the week after moving there. Residents used cars approximately two days a week before moving to HOA Elvsjoe and about one day a week after moving in. However, public transport was used more frequently than before.



Figure 3. Average number of days in a week that the different transport modes were reported as being used in the pre- and post-surveys for HOA Elvsjoe.

In HOA Haninge, the post-questionnaire was sent out a couple of months after the move to new residencies; still, some changes in travel modes were perceivable from the questionnaires. Public transport was used more frequently (three days a week compared to two days a week). Small changes were perceivable in car travel (car driving was slightly higher in the post-survey while car passengers were slightly lower). As the number of respondents was low (14 people), it is hard to draw conclusions from this data. The interviews can provide us with a more detailed understanding of people's everyday lives—there were people who had both increased and reduced their car use due to the presence of a range of different factors. For instance, Informant 8 worked within walking distance of her apartment (which was also the case before moving to HOA Haninge). Before moving there, she walked to work and could also do all her work-related trips on foot. Now, she works in another district and often has to do work-related trips by car. There were also informants who stated that they had gained improved mobility options since moving to HOA Haninge; for instance, Informant 7 said that her children can now travel by themselves to their grandparents' house (because they now live so close to the commuter train), Informant 9 said that she has a better social life as she can meet her friends more often in the city center, and Informant 11 can visit new places using the car club.



Figure 4. Average number of days in a week that the different transport modes were reported as being used in the pre- and post-surveys for HOA Haninge.

The interviews indicate that there have been changes in car ownership between the pre- and post-studies, which is in line with the survey results. Some residents sold their car when they moved, and others acquired a private car. The interviews also provided insights into the often-complex motives behind car ownership. Car ownership, and the reasons for owning or not owning a car, is dependent on a range of factors beyond parking and mobility services. Some factors that influence car ownership are family composition (moving out, moving in with someone, etc.), employment, access to company cars, and activity patterns. The interviews indicated that measures at the HOAs (i.e., fewer parking spaces and mobility services) constituted elements that can influence car ownership, and in some cases may tip the balance, resulting in people selling their cars (or not acquiring one). More limited and expensive car parking together with mobility services may thus contribute to individual decisions to sell a car or—probably to a greater extent—post-poning car ownership. A few examples of the often complex and intertwined reasons for owning and not owning a private car are given in this section. The cases were selected to represent different occurrences and not to be statistically representative.

Access to a parking space was important to some informants, especially in HOA Haninge. Some of them said that they were promised a parking space, otherwise they would not have bought the apartment. Informant 12 lived in a detached house in Haninge with her husband before moving to HOA Haninge. In the pre-interview, she very clearly stated that her household needs a car and that she was planning to bring hers to HOA Haninge. She also said that she would not have bought the apartment if she had not been promised a parking space. Her husband uses the car for commuting since it is a lot faster to commute by car than by public transport. They also use the car for a range of leisure trips.

"Yes, we have been promised [a car parking space]. We wouldn't have moved in otherwise, because it's a freedom to have a car, however you look at it." (Informant 12, pre-interview)

There were also people who planned to sell their car before moving to HOA Haninge and HOA Elvsjoe. Some of them actually sold their cars (Informants 4 and 10), but others did not which is an interesting example of the complexity of how mobility practices are intertwined with bundled practices. One example of this is Informant 7. She and her husband had received information about the scarcity of parking spaces and of the parking charges during an information event, which made them consider selling the car.

"It's a problem with the car because there won't be many parking spaces. Then we thought—it [the apartment] is close to the commuter train [...] the commuter train is perfect. I think we'll sell the car. Because I mean paying for one, what was it, one thousand four hundred, approximately, if not more, for a parking space feels a bit too [much]. Then I can buy two SL cards [public transit cards] to travel around. Yes, I believe we will use the commuter train a lot more. That is why we wanted to move close, so as not to be dependent on the bus [...] there are so many changes. Here, it's direct to the city, to the city center. So, we will probably sell the car and use public transport more." (Informant 7, pre-interview)

According to Informant 7, there was only one errand that was deemed difficult to do without a car—taking her child to sports activities (approximately three times a week). At the time of the post-survey, Informant 7 still had the car and used it for different errands, especially to give her child a lift to sport activities, but also to take her children to school and kindergarten (they were at the same school as before), go food shopping, and sometimes visit family.

"We have not [sold the car, to a direct question], but we have thought about it. But what makes it difficult is that we're dependent on it due to my son's training [...], and it's not only one training session, it is, yes, right now it's two training sessions [a week] and during the summer it will be three times plus one or two matches [...] a week, yes. [...] Sometimes a training session can start at 6 pm and end at 7 or 7.30 pm. And then you'd be taking a tired child on the commuter train or underground [...] So we've preferred to, we've kept the car until, yes, yes, until we decide to not keep the car and he changes, or changes teams." (Informant 7, post-interview)

There are furthermore examples of people who sold their car and who state that their decision to do so was influenced by the mobility services. However, the connection between mobility practices and other bundled practices was also apparent in these cases. In some cases (e.g., Informants 14 and 21), car ownership was closely linked to the provision of company cars. When the informant changed jobs and no longer had access to a company car, she tried out the new mobility services (public transport and car clubs) and realized that they could manage without a private car.

Another example is Informant 2 who lived with his parents before moving to HOA Elvsjoe. He did not own a car at the time of the pre-interview but has now moved in with a partner who has a car. Informant 2 tells us that they did not rent a parking space at first, but instead parked his car at his parents' (who live nearby). During the spring he needed the car for some errands, and he went on the waiting list for a parking space at the HOA. After a few months on the waiting list, he was offered a parking space to rent. At the time of the post-interview, he had decided to sell the car because he thought the car club, bicycle club, and public transit worked well. At a follow-up interview a few months later (6 May 2019), he stated that he had sold the car.

"I think they're great [the mobility services]. That's also a part of the reasons for, I mean, if we had lived where we live without the mobility services, then we would probably have kept the car." (Informant 2, post-interview)

Another related example is Informant 9 who is retired and does not travel every day. She believes that a car club could be an alternative to a private car, but she feels insecure about the car club (will there be a car available when I need one?). She has therefore brought her car to HOA Haninge but says that she will probably manage without a private car when it is too old to use.

Finally, there are examples of informants who sold their cars. Informant 10 is retired and previously lived in a detached house with his wife. He sold the car upon moving to HOA Haninge, which was also the plan. According to the pre-interview, Informant 10 initially had the intention of renting a parking space at HOA Haninge, but during an information meeting, at which he was informed about the scarcity of parking spaces, he decided to sell the car. Other reasons influencing his decision were the good supply of public transport and services in the area. He also said that he has friends without a

private car who live in areas with worse public transport and he argues that if they can live without a car, so can he.

"This house is almost on top of the commuter train. I don't have to walk at all to reach the commuter train and be able to travel to any corner of the earth, right. And there is a center with everything I need. And I have reached the conclusion and asked myself the question if I need a car when I move. And I have probably been influenced by the commercials from Riksbyggen [the developer] and realized that I don't need [a car]. I plan to get rid of the car when I move there. And live without a one, yes." (Informant 10, pre-interview)

Informant 4, a 30 year old professional who lives alone, had owned a car for several years. They said in the pre-interview that the plan was to sell the car upon moving. That they really did this (via a car sales site online) five weeks after the move to HOA Elvsjoe is evident from both the post-questionnaire and post-interview. In the post-interview, they also says that, during the five weeks, they used the car to go to work "just to move it", because it was "difficult and expensive to have it parked" at HOA Elvsjoe. On-street parking was time limited and they said that the car was therefore re-parked every day. During those weeks "I used the car almost every day to buy furniture" [in the largest shopping area south of Stockholm] and once "to drive my partner [who lives abroad] to the airport".

Thus, our results indicate that there were changes in travel habits, vehicle ownership, and the use of mobility services which is what the project intended. However, the cause and effect relationships were complex and connected to bundled practices. The interviews also indicated that access to public transport influenced decision-making on whether to buy the apartments for most informants, which is also a factor that may influence car ownership. However, the availability of other mobility services was not mentioned as a reason for the choice of apartments, and the knowledge of these services was low at the time of the pre-study, especially in HOA Haninge. The availability of car parking spaces was a pre-condition for two of the informants at HOA Haninge, and the developers stated that some prospective buyers chose to not move to HOA Haninge as they could not be promised a parking space. The availability of parking spaces seemed to be less of an issue in HOA Elvsjoe (no one mentioned parking spaces as something they considered when buying the apartments. Furthermore, according to the developer, there were not any prospective buyers who chose not to move to HOA Elvsjoe due to the scarcity of car parking spaces). In the following section, we discuss how these indicative results can be interpreted using social practice theory.

3.4. Mobility Practices

This section includes an interpretation of our findings to provide an understanding of entering and leaving mobility practices. A mobility practice can be viewed as consisting of several interconnected elements and being reshaped as practitioners perform the practice in new ways.

With regard to our research question about how previously relatively marginal practices among the population (e.g., vehicle clubs) have developed in the new residences, we found that the comparatively marginal practice of vehicle sharing had found new practitioners associated with the occupation of these two HOAs. In this case, it might be that "new recruits are required, competences have to develop from scratch and new habits have to take hold" (p. 162) as Shove and Pantzar [25] write. An approach related to SPT, but delimited to the study of travel, is one that deals with mobility capital (motility). Here too, the focus is on individuals and their skills in their social and material contexts. Mobility capital (motility) has been defined as "a person's capacity to engage in travel, comprised of personal access, skills and cognitive appropriation" [26]. Elaborating on this, Shliselberg and Givoni [27] state that "personal access reflects life choices and constraints that define what mobility resources and choices are available".

Concerning the dominant mobility practices of private motoring and public transport, our results provide instances of leaving the practice of motoring as well as intensifying use of public transport

in connection with the move. Entering and leaving practices of automotive and public transport can be understood through SPT theory. We can assume that for such widespread and frequent practices, competences and understandings are readily available which enable participation through personal and related-party experiences. However, this does not have to be the case for vehicle sharing for example [20]. Evidence of this was found both in the questionnaires and the interviews. For instance, only one respondent was a member of a car club before moving to the new apartments, and there was very limited knowledge about and experience of car clubs. Some of the residents reported feelings of insecurity about the car club ("will there be a car available when I need one?") and claim that they therefore brought their private cars with them when they moved. Another example is Informant 8 who says she sold her second car upon moving to HOA Haninge. She registered with the car club but forgets about this option at an occasion when she needed a car. This indicates that the full competences may be lacking [20]. As more people start using the car club, narratives and expectances around car clubs may change, and the car club practice may recruit more practitioners. If successful, it may be expected that the car club practice will grow and recruit more practitioners over time, which would potentially contribute to reducing car ownership. In line with this we have also observed that the car club is mostly used by people who do not own a private car, and that some of these people have refrained from acquiring a car, at least partly due to the availability of the car club. According to SPT, as well as to the *motility* approach, it is possible to discern how specific modes of travel are framed socio-culturally, for example by gender-based norms. In our study it was seen how the use of the HOAs' bicycle and car clubs is framed by uncertainty versus self-assurance. This could be derived from sociocultural repertoires whose variation may partly be gender-based. For example, interviewees expressed uncertainty regarding booking apps and parking in garages when thinking about or trying out the vehicle clubs, even if our basis was too small to generalize about the extent to which the skills needed for vehicle sharing can be seen as gender-based or age-based patterns. We have concluded that each mobility practice demand skills and access to resources whose availability is and is individually perceived to be, more or less, within reach.

The second research question, related to a municipal policy objective, dealt with the process of abandoning car-dependent practices upon moving to the new apartments. With regard to defecting from the practice of driving, the results indicated that when, where, and how the respondents gained impetus to defect was multifaceted, which means that it is not easy to define when and how such a change comes about and what influences it. Nevertheless, on an overall and long-term level, it appeared that the costs and practicalities, as well as what information that was available in situations when choices needed to be made were crucial. This is not contradicted by SPT, rather the opposite. Shove and Pantzar [25] write that:

"If we are to track the trajectories of specific practices in these terms, we need to identify mechanisms and circumstances of enlisting and defection and show how they relate to patterns of normalisation, de-stabilisation and diffusion. / — / Rather than searching for external explanations as to why some discretionary activities take hold and others do not, the methodological challenge is to home in on the details of what participation involves and how this changes." (p. 156)

The costs of and limited access to parking can certainly be seen as what Shove and Pantzar [25] termed "external explanations". Inspired by SPT, this paper aimed at an understanding of what participation in different mobility practices entails. Rather than external explanations to individual behavior, we found how the conditions for travel, parking, etc., in two HOAs affected participation in a few different mobility practices and the skills, knowledge, and material conditions used and needed for performing these. Furthermore, from the interviews it could be understood how and when the parking situation as well as knowledge and/or experience of the mobility services interacted with other circumstances and considerations and led to individual decisions of if, when and how to defect from a private car driving practice. This means that the private driving practice can include parking that is (perceived as) easily accessible and/or that public transport and mobility services are perceived

as insufficient or genuinely unknown. Parking far from home, selling the car, etc., could be seen as performances of defection which were related to changes in family situation or professional life for example. Together with changes in daily life circumstances, the parking and mobility situation in new housing gives impetus to defection from and enlisting to and between mobility practices.

We have also seen in the results how information meetings and moving-in events, as well as parking fines and hassles, could have been mechanisms that triggered defection from some practices and enlisting to others. Participating in an automotive practice presupposes conditions consisting of combined material elements and understandings, conditions that, due to the implemented measures, were no longer available in the same way as in more car-adapted housing blocks.

4. Discussion

In this section, we comment on the usefulness of using mixed methods (Section 4.1.). We also discuss the results and relate them to wider literature (Section 4.2.).

4.1. Benefits and Challenges of Using Mixed Methods

On a general level, combining data about the residents collected through the different methods of questionnaires, booking statistics, and in-depth interviews was helpful in assessing and understanding changes in travel practices. When the one method did not produce results that were as clear as we had hoped for, another method could be used to clarify results and interpretations. One specific advantage appeared when we followed-up the questionnaires with in-depth interviews (with the same respondents) and then later also followed-up on some of these with shorter interviews on specific issues. In some cases, it actually helped to confirm or reject indicative causal relationships. One example is the relationship between car ownership and household type where changes in car ownership were explained by respondents moving away from their parents' home to their own accommodation in HOA Elvsjoe without bringing their own or their parents' car. The interviews allowed us to confirm that the process could look like this. This was something that we could not have understood merely from the questionnaires, since we did not include any questions about moving away from home. Put simply, we had not realized in advance (when constructing the questionnaire) that this might be an important aspect. We also became more familiar with the considerations and motives behind not bringing a car or not replacing one in order to be able to have continued access to a private car.

On a more general level, we found that the synergy between the two methods can be particularly valuable in intervention studies where the group of people (the population) affected by the measures is typically relatively small. The statistical significance for the relationship between factors then becomes weak, especially if the proportion of the group who answered the questionnaire both before and after implementation was not high. Through follow-up interviews, the connections can be examined in-depth.

The data we collected from our mixed methods was analysed by primarily drawing inspiration from practice theory. However, we think that our data and results could have been analysed in rewarding ways also through other social constructivist perspectives, one being the mobility capital approach mentioned above. To conclude this section, we discuss yet another such approach, actor-network-theory (ANT), using changes in car ownership as an example.

We had indications that divesting of (selling) private cars was a relatively long process which included some crucial steps. One possible advantage of ANT in this case is its very clear focus on material objects (using the concepts of *elements, actants,* etc.) and processes (*action programs,* and *projects*). According to ANT, a private car in one household would be seen as an actant enrolled, and having agency, in the project "to possess a car". Selling, donating or scrapping a car could be seen as the termination of the household car project or as a new related project. In this process, other actors also play roles. Examples of actors include those who provide and price parking, provide sales channels, government agencies and their formal processes, etc. With more time and resources, we could have

tried to deepen our analysis of "divesting of cars" with the help of ANT. However, we argue that SPT was still useful for analyzing the process, materiality, etc., with regard to changes in car ownership.

4.2. Discussion of the Results

Minimum parking standards have traditionally been used to ensure the availability of parking spaces when building new apartments. These standards have had several negative consequences and are not in keeping with many cities' goals and visions [16]. At the same time, there is a wider discussion about the need to change planning paradigms where focus shifts away from vehicles and traffic flows to people and accessibility [15]. In these new planning paradigms, there is a greater focus on reducing the need for transport because accessibility can also be achieved in other ways.

Using flexible parking requirements instead of minimum parking standards is a policy shift in line with these trends. Our interview findings include how different practices recruit or lose practitioners which reflect the results from the questionnaires regarding, for example, that residents' car ownership was lower than before and that they used public transport more frequently which is in line with the above-mentioned policy objectives. Furthermore, we observed, for some people, that access to a car club enabled them to undertake trips that they were previously unable to do. It thus seems possible to reduce car use at the same time as more people have access to cars.

It is reasonable to expect that flexible parking requirements, if applied on a larger scale, could be one policy measure that can facilitate recruitment to what are currently fairly marginal vehicle sharing practices. We have seen that these practices are relatively unknown at the moment but have recruited an increasing number of new practitioners in these new residential buildings. As the practice recruits more practitioners, skills and understandings involved in the practice are likely to change which may contribute to more widespread recruitment. If this is the case, it may take some time for the vehicle-sharing practice to recruit members from private car practice. This is something we intend to follow-up on in a future research project.

We have also seen that the design of car clubs is important. New residences will only constitute a small proportion of all residences in cities, and it is important to offer mobility services to people living in existing residential buildings as well. Flexible parking requirements can facilitate such a transition by opening up car clubs to everyone in an area (as is the case with the car club in HOA Elvsjoe). We have seen that many people living outside HOA Elvsjoe have used the car club. However, how best to design the car club still needs to be studied. An open car club may require more cars and could reduce the availability of cars for residents. We have seen that many people feel reluctant to join a car club because they fear a car will not be available when they need one.

5. Conclusions and Implications

The plans for mobility and parking in the two blocks of flats studied broadly seem to have been implemented. The planned mobility services, such as vehicle clubs, easily accessible and secure bicycle parking, and subsidized monthly passes for public transport have been made available to those who have moved in. There are fewer parking spaces in or immediately adjacent to the blocks of flats than is normally the case. As far as we can judge, the car park construction costs have therefore been comparatively low.

The interviewees still seemed generally satisfied with how they can travel on a day-to-day basis, and with the mobility services and parking available for own cars. Indicatively, the use of private car decreased among those who moved in compared to where they lived before. Thus, it seems worthwhile continuing with this kind of planning as it can contribute to the growth and spread of mobility practices, such as vehicle sharing, and to maintain and stimulate the practice of using public transport. Which in turn could contribute to reducing the environmental impact of residents' travel, as well as reduce the costs of (living in) new buildings. However, the study indicates that learning about and spread of still marginal practices are slow, which has led us to the hypothesis that the conditions (technologies, ways to find, book, pay for mobility services, etc.) might need to be relatively stable for new practices to take

a stronger hold. This becomes even more relevant considering that there should be a quick increase in the number of dwellings where flexible/green parking requirements/standards are implemented (which is not unlikely, since these are now part of municipal parking policies). Such a scenario would also imply that other policies might be needed to contribute to the spread of mobility practices other than the use of private cars. To some extent, this is already happening in a city like Stockholm where, for example, the congestion charges, expansion of public transport, and of bicycling infrastructure and traffic, and increased costs for parking have been relatively stable conditions and trends in recent years. However, there are also trends that point in the opposite direction. e. g. that urban highways are being built in and around Stockholm.

When there are significantly fewer available homes with the old parking standards (of around one parking space per apartment), the most car-dependent citizens also probably need to be more attracted or exposed to other and newer mobility practices. This might be related to the concept of "selection" (as in *self-selection bias*). To attract car-dependent citizens, we argue, conditions around the newer practices, such as vehicle sharing, might need to be improved and stabilized by specific policies.

How the plans worked in the respective HOA showed informative contrasts. In HOA Haninge, the change in ownership and use of a private car was less than in HOA Elvsjoe. We linked this in our analysis to differences in age distribution. In Haninge, the age distribution was closer to the average for apartment buyers in the Stockholm area, while that in Elvsjoe had a large element of young first-time buyers. Many of them simply moved away from their parents' home. This led to reduced ownership and private car use due to the fact of their access to (their parents') cars and parking access decreasing when they formed their own household. Thus, an assessment of the proportion of those who moved directly from their parents' home seems important for the planning of parking and mobility services when implementing measures of this kind. Correspondingly, newly retired people constituted a not insignificant group of residents in HOA Haninge, and they gave consideration to car ownership in connection with the move. Thus, the general observation is that, for those in a life-phase shift, moving to a new dwelling could imply an increased preparedness to adapt their car ownership.

When it comes to parking, visitor parking proved to be of relatively great importance to residents. Whether the guests they received in their new home could park and pay for it (and/or avoid fines) was a topic that cropped up in several of the interviews. This was not just linked to the parking on the HOA's own land and garages, but also to the actual street parking situation in the district (within a radius of approximately 0.5–1 km of their home).

As anticipated, a crucial factor for planning and changing the travel habits of the new dwellings was the public transport situation. The lesson is that measures of this kind should continue to be carefully planned based on the role of local public transport nodes in travel habits. To do this, measurements such as objective accessibility, perceived accessibility [28], and similar quantitative methods for assessing accessibility in specific urban locations can be important for those operators who (plan to) use such competences. How the mobility service public transport subsidy is designed and marketed has also proved important and needs to be anticipated and planned for adaptively.

In terms of lessons that go beyond an evaluation of the residents' reported mobility habits, we argue that future interventions can be much more open to the residents of adjacent properties. A finding that led us to this standpoint was that the shared cars in HOA Elvsjoe had been used more by residents in the surrounding local area than by residents of HOA Elvsjoe. It is possible that the car club also enables those neighbors to reduce their car ownership. However, a study of neighbors was beyond the scope of this work. If a wider range of mobility can be offered to the entire neighborhood, possibly even before the new occupancy, this could lead to early and increased visibility and use of mobility services, especially of vehicle clubs, for which we also found experience, skills, and know-how was still not widespread. Vehicle sharing can be seen as a practice, constituted by meanings, materials, and skills, that can spread (somewhat metaphorically) as growing geographical spots of practitioners with appropriate skills.

The following observations were also made in relations to the findings of this study: There is a need for a knowledge base of flexible parking requirements to be applied for new developments. We suggest that such a base should include the evaluation of houses in different contexts using the same evaluation framework. Interesting contexts include those where the quality of public transport availability and parking prices vary, as well as locations with different levels of accessibility on foot to local amenities such as food shops, leisure and culture.

Impacts of mobility as a service and other measures applied in the two blocks of flats on the travel habits of householders may vary over time. We identified three occasions as windows of opportunity: (a) when moving house and, therefore, adjusting travel habits as well as encountering different parking prices (especially for groups in life-phase shifts, see above), (b) when car-free households consider buying a car, but might consider using car (sharing) as a service instead, and (c) when a car owned by a household comes to the end of its lifetime and a considerable reinvestment in the form of a new vehicle is considered. To cover such occasions, any evaluation carried out needs to follow residents over a longer period of time, ideally over several years. This is what the authors also intend to do in a five-year project for which funding has been applied for from the Swedish Transport Administration in 2019.

We also see the choice of business model for each particular car club operating in an area as important since it has impacts on the effects that can be expected on parking demand, as well as on costs for developers and homeowners' associations. We would also like to argue that accessibility services, other than those available to the homeowners we studied, should be considered, e.g., shared or on-demand micro-mobility or job hubs at urban nodes. Services like this, publicly, co-operatively or commercially provided, could potentially become important elements of the sustainable accessibility that is created or strengthened in transport planning in connection with future city district development (with or without considerable new construction).

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References

- 1. Lundin, P. Bilsamhället: Ideologi, Expertis och Regelskapande i Efterkrigstidens Sverige; Stockholmia: Stockholm, Sweden, 2008.
- 2. Shoup, D.C. The trouble with minimum parking requirements. *Transp. Res. Part A* **1999**, *33*, 549–574. [CrossRef]
- 3. Barter, P.A. A parking policy typology for clearer thinking on parking reform. *Int. J. Urban Sci.* 2015, 19, 136–156. [CrossRef]
- 4. Mingardo, G.; Van Wee, B.; Rye, T. Urban parking policy in Europe: A conceptualization of past and possible future trends. *Transp. Res. Part A* **2015**, *74*, 268–281. [CrossRef]
- 5. Andersson, M.; Mandell, S.; Thörn, H.B.; Gomér, Y. The effect of minimum parking requirements on the housing stock. *Transp. Policy* **2016**, *49*, 206–215. [CrossRef]
- Schreine, H.; Marsalek, J. Innovative Stormwater Management in Canada—The way forward. Water Qual. Res. J. Can. 2008, 44, V–X. Available online: https://www.researchgate.net/ profile/Hans_Schreier2/publication/269128169_Innovative_Stormwater_Management_in_Canada/ links/599b170545851574f4ac62d0/Innovative-Stormwater-Management-in-Canada.pdf (accessed on 26 September 2019).

- 7. Christiansen, P.; Engebretsen, Ø.; Fearnley, N.; Hanssen, J.U. Parking facilities and the built environment: Impacts on travel behaviour. *Transp. Res. Part A* **2017**, *95*, 198–206. [CrossRef]
- 8. McCahill, C.T.; Garrick, N.; Atkinson-Palombo, C.; Polinski, A. Effects of Parking Provision on Automobile Use in Cities: Inferring Causality. *Transp. Res. Rec. J. Transp. Res. Board* **2016**, 2543, 159–165. [CrossRef]
- 9. Envall, P.; Johansson, P. *Parkeringsavgifter och parkeringstal i bostadshus byggda 2000–2011 i Stockholm;* Unpublished report; Trafikutredningsbyrån: Stockholm, Sweden, 2014; pp. 1–26.
- 10. Thigpen, C.G.; Volker, J.M.B. Repurposing the paving: The case of surplus 25 residential parking in Davis, CA. *Cities* **2017**, *70*, 111–121. [CrossRef]
- 11. Willson, R.; Roberts, M. Parking Demand and Zoning Requirements for Suburban Multifamily Housing. *Transp. Res. Rec. J. Transp. Res. Board* **2011**, 2245, 49–55. [CrossRef]
- 12. Li, F.; Guo, Z. Do parking standards matter? Evaluating the London parking reform with a matched-pair approach. *Transp. Res. Part A* **2014**, *67*, 352–365. [CrossRef]
- 13. Foletta, N.; Field, S. *Europe's Vibrant New Low Car(bon) Communities*; Report; ITDP: New York, NY, USA, 2011; p. 118.
- 14. Plevnik, A.; De Tommasi, R.; Welsch, J.; Rye, T. WP D—MaxLupo Guidelines for the Integration of Mobility Management with Land Use Planning; Report. Version 1.7; EPOMM: Leuven, Belgium, 2014.
- 15. Banister, D. The sustainable mobility paradigm. Transp. Policy 2008, 15, 73-80. [CrossRef]
- 16. Firth, D. Urban Mobility Strategy. In *Swedish: Framkomlighetsstrategin;* The city of Stockholm: Stockholm, Sweden, 2012.
- 17. The City of Stockholm. *Riktlinjer för Projektspecifika och Gröna Parkeringstal i Stockholm för Bilparkering. Beslutad i KF. 2015-10-19;* The City of Stockholm: Stockholm, Sweden, 2015.
- 18. Melia, S. Carfree and low-car development. Transp. Sustain. 2014, 5, 213–233.
- 19. Antonson, H.; Hrelja, R.; Henriksson, P. People and parking requirements: Residential attitudes and day-to-day consequences of a land use policy shift towards sustainable mobility. *Land Use Policy* **2017**, *62*, 213–222. [CrossRef]
- 20. Kupersmidt, J.; Henriksson, G. Vem Saknar En p-Plats? Bostadsrättsinnehavares syn på Boendemiljö, Egen bil, Fordonspooler och Mobilitetstjänster; Royal Institute of Technology: Stockholm, Sweden, 2014.
- 21. Scheiner, J. Why is there change in travel behavior? In search of a theoretical framework for mobility biographies. *Erdkunde* **2018**, *72*, 41–62. [CrossRef]
- 22. Johansson, F.; Henriksson, G. En Modern Entré till mer Bilfria Vardagsliv i Älvsjö och Haninge? Lägenhetsköpares Resvanor, Dagliga Aktiviteter och Förväntningar före Flytt Till BRF On Track och BRF Blicken, med Mobilitetstjänster och Låga Parkeringstal; KTH: Stockholm, Sweden, 2018.
- 23. Handy, S.; Xinyu, C.; Mokhtarian, P. Correlation or causality between the built environment and travel behviour? Evidence from Nothern California. *Transp. Res. Part D Transp. Environ.* 2005, 10, 427–444. [CrossRef]
- 24. Yin, R.K. Validity and generalization in future case study evaluations. Evaluation 2013, 19, 321–332. [CrossRef]
- 25. Shove, E.; Pantzar, M. Recruitment and Reproduction: The Careers and Carriers of Digital Photography and Floorball. *Hum. Aff.* **2007**, *17*, 154–167. [CrossRef]
- 26. Flamm, M.; Kaufmann, V. Operationalising the Concept of Motility: A Qualitative Study. *Mobilities* **2006**, 1, 167–189. [CrossRef]
- 27. Shliselberg, R.; Givoni, M. Travel experiences as a source of motility: Evidence from a study of adult women. *Appl. Mobilities* **2019**, 1–16. [CrossRef]
- 28. Lättman, K.; Olsson, L.E.; Friman, M. A new approach to accessibility—Examining perceived accessibility in contrast to objectively measured accessibility in daily travel. *Res. Transp. Econ.* **2018**, *69*, 501–511. [CrossRef]



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