Entering, enduring and exiting: The durability of shared mobility arrangements and habits

Brendan J. Doody[a*], Tim Schwanen[a], Derk A. Loorbach[b], Sem Oxenaar[b], Peter Arnfalk[c], Elisabeth M. C. Svennevik[d], Tom Erik Julsrud [e], Eivind Farstad[f]

[a] Transport Studies Unit, School of Geography and the Environment, University of Oxford, South Parks Road, Oxford, OX1 3QY, United Kingdom: brendan.doody@ouce.ox.ac.uk; https://orcid.org/0000-0001-8189-7371; tim.schwanen@ouce.ox.ac.uk; https://orcid.org/0000-0001-7376-5854

[b] Dutch Research Institute for Transitions (DRIFT), Erasmus University Rotterdam, 3062 PA Rotterdam, The Netherlands; loorbach@drift.eur.nl; https://orcid.org/0000-0002-4422-0019; semoxenaar@gmail.com

[c] The International Institute for Industrial Environmental Economics, Lund University, 221 00 Lund, Sweden; peter.arnfalk@iiiee.lu.se

[d] TIK Centre for Technology, Innovation and Culture, Faculty of Social Sciences, University of Oslo, Oslo, Norway; e.m.svennevik@tik.uio.no; https://orcid.org/0000-0001-7133-9376

[e] CICERO Center for International Climate Research, Gaustadalleen 21, 0349 Oslo, Norway; tom.julsrud@cicero.oslo.no; https://orcid.org/0000-0002-1853-7434

[f] Institute of Transport Research, Oslo, Norway, Eivind.Farstad@toi.no; https://orcid.org/0000-0003-0364-5560

* Corresponding author: Tel: +44-(0)1865-285538; Email: brendan.doody@ouce.ox.ac.uk

Entering, enduring and exiting: The durability of shared mobility arrangements and habits

Abstract

Car sharing could support a transition away from private vehicle ownership and use. Attempts to understand participation in car sharing have primarily focused on minor and major disruptions which catalyse change in practices. This paper examines how processes of entering, continuing or exiting car sharing systems unfold in Norway, the Netherlands, Sweden and the UK. Car sharing is conceptualised as an arrangement of elements assembled, adjusted and supported by events, practices and habits. Drawing on biographically-oriented household interviews, we build on and extend existing understandings of change and stability in car sharing in four ways. First, by focusing on households rather than individual users, the paper complements recent attempts to understand the decoupling of family and private-car-based mobility. Second, under-examined processes of exiting, alongside entry and continuation are considered. Third, it highlights the importance of recognising more imperceptible, gradual and continuous changes which might not necessarily coincide with a disruptive event. Fourth, habits of shared car arrangements are demonstrated to be fragile and not as deeply ingrained as those associated with ownership. Existing household practices and habits thus raise further questions about the potential for shared mobility services to disrupt the primacy of the car.

Keywords

Arrangement; car sharing; disruption; events; habit; mobility biographies; shared mobility

Introduction

Shared mobility systems provide short-term access to bicycles, scooters, cars and vans, and informal or formal carpooling, ride sharing and ride hailing services (Arcidiacono and Duggan 2020). There are high expectations, particularly with the development of automated vehicles, about how these innovations will support a transition away from a mobility regime centred on private vehicle ownership and use (Urry 2004; Kesselring, Freudendal-Pedersen and Zuev 2020). Sharing citizens, cultures and practices are actively produced through discourses,

organisational strategies, rules and procedures, technologies (Spinney and Lin 2018; Akyelken, Banister, and Givoni 2018), and socially differentiated access to property markets and public transport, walking and cycling infrastructures which enable and support use of shared systems (Dill and McNeil 2021). Processes of entering and exiting from these systems have primarily been attributed to disruptive events such as the provision of a new mobility service, purchase or sale of a vehicle, the birth of a child or retirement (Kent, Dowling, and Maalsen 2017). Willingness to experiment and cope with issues (Normark et al. 2018; Kent and Dowling 2018) and the possibilities and meanings they afford are, meanwhile, seen as central to ongoing participation (Dowling and Maalsen 2020; Laakso 2017).

This paper examines the processes involved in entering, enduring and exiting car sharing in Norway, the Netherlands, Sweden and the UK. We explore how elements configured in shared car arrangements co-evolve and are strengthened and weakened by events, practices and habits. The paper contributes to existing scholarship in four ways. First, by focusing on households rather than individual users, it complements recent attempts to understand the decoupling of family and private-car-based mobility (Dowling and Maalsen 2020; McLaren 2018). Second, under-examined processes of exiting, alongside entry and continuation are considered. Third, it highlights how one-off, series and sequences of disruptive and non-disruptive events generate change and stability in everyday (im)mobility. Fourth, habits of shared car arrangements are demonstrated to be fragile and not as deeply ingrained as those associated with ownership. Existing household practices and habits thus raise further questions about the potential for shared mobility services to disrupt the primacy of the car (Wells et al. 2020; Storme et al. 2020).

Understanding car sharing: Events, arrangements and habits

Car sharing is provided primarily through business-to-consumer (B2C), business-to-business (B2B) and peer-to-peer (P2P) models and roundtrip/station-based (i.e., start and end at the same location) and free-floating/flexible (i.e., start and end at different stations or within designated parking zones) services. Car sharers are generally young (typically 25-45 years old), well-educated, have higher than average incomes, and live in urban neighbourhoods well served by public transport (Le Vine, Zolfaghari, and Polak 2014). They own fewer cars and often sell or postpone purchasing a car upon joining a scheme (Martin and Shaheen 2011). On average, car sharers rely more heavily on public transport, walking and cycling, and travel fewer kilometres

and make fewer trips by car than non-sharers (Le Vine, Zolfaghari, and Polak 2014; Martin and Shaheen 2011). Car sharers rarely hire shared vehicles for everyday journeys like the school run or the commute to work (Kent and Dowling 2013). Instead, they use vehicles off-peak and on weekends for shopping, visiting family and recreational activities (Svennevik, Julsrud and Farstad 2020). Access to shared vehicles enables households to fill gaps left by the limited provision, carrying capacity or inflexibility of non-car-based alternatives (Kent and Dowling 2013).

Disruptive change: Mobility biographies, key events and catalysts

The circumstances which contribute to households entering, continuing or exiting car sharing have received limited attention. A mobility biographies approach can provide a dynamic understanding of these processes. Adopting a longitudinal perspective, this approach examines the factors which sustain and transform everyday mobilities over the life course (Lanzendorf 2003; Scheiner 2007). While extending and supplementing more static explanations, both behaviourally- and practice-oriented perspectives on mobility biographies, have tended to prioritise disruptions as a primary source of transformation in everyday movements (Plyushteva and Schwanen 2018).

Behaviourally-oriented research assumes that change, including processes of entering and exiting car sharing (e.g., Chatterjee et al. 2013; Jain, Johnson, and Rose 2020), is driven by two main types of disruptions or 'key events' (Rau and Manton 2016). *Life events* include joining the workforce, buying a new home, having a child, children leaving home or retirement (Chatterjee et al. 2013; Jain, Johnson, and Rose 2020). These events might occur independently of or intersect with mobility events, the second type of disruption. Buying or selling a car, the introduction of car sharing services and increased or decreased public transport access can also influence entry into and exit from car sharing (Chatterjee et al. 2013; Jain, Johnson, and Rose 2020). These pre-defined life and mobility events affect and change mobility practices by disrupting the previously stable context in which those practices were performed (Lanzendorf 2003).

Practice-oriented perspectives have conceptualised dynamics in mobility in terms of 'careers' (Greene and Rau 2018) and 'catalysts' (Kent, Dowling, and Maalsen 2017). Kent et al. (2017) identify three types of disruptive events which catalyse the start of a car sharing career in

households. These are: comparatively *simple shocks* linked to one or two key events such as an international relocation, a job loss or a broken-down car, which precede the decision to join; *bundled disruptions*, where shocks like changes to work, housing and parking policies are 'punctuated and layered through time and space, connected and overlapping' (Kent, Dowling, and Maalsen 2017, 203); and *contextual developments* like the introduction of shared vehicles, online grocery delivery services and new public transport systems, which (in)directly make car sharing possible by enabling alternative mobility and lifestyle practices.

This paper builds upon and extends mobility biographies scholarship by examining how disruptions and other sequences and series of events, practices, and habits influence under-examined processes of entering, continuing and exiting car sharing. We now elaborate on 'non-disruptive' events, arrangements and habits to develop this account.

Non-disruptive events, arrangements and habits

Minor or major disruptions are one class of events which produce transformations in everyday movements. Interrupting, impeding or altering normal activities, schedules and routes, disruptive events exceed a threshold or are marked by particular intensities (Bissell, Vannini, and Jensen 2017). Focusing on disruptions overlooks less forceful events and non-abrupt types of change. Reconfigurations or adaptations can be more imperceptible, gradual and continuous and might not necessarily coincide with or be easily attributable to key events (Doody 2020; Plyushteva and Schwanen 2018). Similarly, a chance or random encounter may be of relatively little significance in isolation but can induce significant change as part of a sequence or series of other events. Mobility biographies scholarship, therefore, could benefit from concepts like arrangement and habit that are more attuned to diverse dynamics and temporalities of change and stability.

An arrangement is a process in which the ability to act and meaning of action emerge from the ongoing assembling of heterogeneous elements and the adjustments of elements relative to each other (cf. Callon 2005). Elements within an arrangement are human and non-human and can include embodied skills, knowledge, beliefs, emotion, rules and norms, material objects, technical devices and infrastructures. Through processes of assembling and adjustment, arrangements come to exhibit some degree of stability and order in a constantly shifting world (cf. Callon 2005; Cochoy 2014). They change as elements pass in and out of the arrangement

and individual components and their connections within undergo transformation (Hagberg 2016; Normark et al. 2018).

Conceptualising car sharing as an arrangement has various consequences. First, participating households, service providers, city planners and various non-human elements contribute to the processes of assembly and adjustment that stabilise, order and change car sharing arrangements. Second, these processes give rise to configurations which can variously enable, constrain, reinforce, disrupt and/or destabilise particular modes of response, action and meaning (cf. Normark et al. 2018). Third, perceptions of an arrangement's affordances emanate from encounters, practices and habits (Gallagher, 2017). Perceived or experienced affordances can support entry and continuation, particularly when they facilitate practices or positively affirm decisions and aspirations. Constraints and issues can be experienced as necessary trade-offs or as frictions which ~~can~~ gradually result in re-evaluations or exit from an arrangement. Fourth, the practices and habits associated with the arrangement, in turn, co-evolve alongside it and strengthen or weaken its stability (Callon 2005; Hagberg 2016). Fifth, an event or a series or sequence of events links a car sharing arrangement to the broader world of practice, habit and flux. Six, the diverse temporalities of the long-term and the everyday are woven together by events and processes of assembling, adjustment and co-evolution within and outside of a car sharing arrangement.

Understanding stability and change also requires reconceptualisation of how habit has been viewed in mobility biographies (Doody 2020). Generally construed as automatic and mechanistic responses to environmental stimuli (e.g., Lanzendorf 2003; Scheiner 2007), habits can alternatively be approached as impersonal, creative tendencies or dispositions that generate continuities and difference in social and cultural life (see Bissell 2014; Schwanen, Banister, and Anable 2012). A series of implications follow. Habits are 'assertive, insistent, self-perpetuating' as they are acquired under material and social conditions set by 'prior' collective or shared customs (Dewey 1922, 58). 'Individual' activities are not unimportant as we learn dynamic, propulsive and generative acts, such as how to seamlessly adjust pedals, gears and steering wheels in ordered and systematic ways, through repetition. But providing 'more or less integrated systems of activity', pre-existing customs and arrangements take 'priority' (Dewey 1922, 60) and transmit and make common 'experiences, ideas, emotions [and] values'

(Dewey 1920, 207). Preceding choice, they explain why private car use often seems so natural, inevitable and uncontroversial (Paterson, 2007; Sheller, 2004).

Events and encounters can reinforce, modify or disrupt habits. Responses are readier and less conscious in familiar and recognisable situations accommodated and adjusted to in previous experience. More demanding, challenging or novel circumstances like a broken-down car are experienced as frictions which impede or interrupt normally efficient and undisturbed habits. Such 'problematic' or 'undetermined' situations are characterised by 'shock, confusion, perturbation, uncertainty' (Dewey 1922, 181) and require minor or major adaptations or the development of new habits through deliberation. Deliberation is 'an experiment in finding out what the various lines of possible action are really like' by way of 'tentative rehearsals in thought' (Dewey 1922, 190). Undisturbed habits restrict the reach and fix the boundaries of deliberation and qualify the setting as objects and meanings that 'attract, repel, satisfy, annoy, promote and retard' (Dewey 1922, 192). As deliberation 'proceeds', an object or meaning 'reinforces, inhibits, redirects habits already working or stirs up others … not previously actively entered in' until 'some combination … finds a way fully open' and a 'choice, decision, takes place' (192). This process ensures that the past, present and future enter into all individual and collective deliberations, including those around car sharing.

Prior customs and this qualifying role illustrate how habits continue to function in a subdued and subordinate form despite appearing dormant and inoperative. Early experiences living without a car (Sattlegger and Rau 2016), for example, can shape feelings, ideas, and values, even when for extended periods, journeys are 'only occasionally or rarely' (Dewey 1922, 37) made by bicycle or public transport. As 'environments overlap', 'situations are continuous and those remote from one another contain like elements, a continuous modification of habits by one another is constantly going on' (Dewey 1922, 38). These ongoing adaptations, and the 'interpenetration of habits', are central to the development of more or less enduring subjectivities and the arrangements in which those subjectivities are imbricated (Dewey 1922, 38). In summary, habits shape what we do, think, feel and who we are. The process and strength of habituation, as our findings on privately-owned and shared car arrangements shows, depends on the elements and affordances of a given arrangement and associated practices and habits.

Exploring car sharing in Western Europe

This paper draws on biographically-oriented, qualitative interviews with households in Norway, the Netherlands, Sweden and the UK. These were undertaken as part of a collaborative project involving researchers from each country. All were conducted using a shared, semi-structured interview schedule, developed in English and translated into Norwegian, Dutch and Swedish. Interviews focused on participants' experiences and interpretations of car sharing but also their household history, everyday mobility, caring responsibilities, shopping, leisure, holidays and future plans and expectations. Questions and prompts explored how change was or might be initiated, shaped by or associated with different types of events and encounters. Ethics approval was obtained from the University of Oxford (Ref. SOGE 17A-188). Participants were recruited through online advertisements on social media platforms, virtual noticeboards, existing contacts and snowballing. Small financial incentives were offered in Norway. Interviews were conducted primarily with one but sometimes two members of a household.

Seventy-five interviews were completed between June 2017 and June 2018. The number conducted in each country differed due to resource constraints. Thirty-eight interviews were conducted in Norway (Oslo=38), 7 in the Netherlands (Breda=2; Rotterdam=3; Utrecht=2), 12 in Sweden (Lund=9; Malmo=3) and 18 in the UK (London=6; Oxford=12). Given these variations, it was decided to pool the interviews and create a more diverse and heterogeneous sample (see Table 1). The full set of interviews allow us to examine processes of entering, enduring and exiting across a range of geographical contexts but does not enable direct comparisons. Social, cultural and institutional variations that might shape car sharing arrangements in different countries are highlighted where possible.

The primary analysis was conducted by members of the UK team. Interviews not conducted in English in the Netherlands, Norway and Sweden, were translated using Google Translate. The UK team read and analysed these transcripts in Atlas.ti using thematic content analysis. Particular attention was paid to unique, intersecting and cumulative events of varying durations, intensities and significance. Empirical materials deemed illustrative of themes were checked for mistranslation or misinterpretation by team members in respective countries.

[Insert Table 1. about here]

Entering, enduring and exiting car sharing

Our findings reinforce the need to move beyond thinking about entry or exit as a clearly identifiable instant or one-off event. Both can, and often do, involve protracted processes of deliberation which fold together past, present and future in complex ways. Correspondingly, various factors play a role and ensure that the boundaries between entering, continuation and exiting are fuzzy and porous. We begin by exploring the overlapping and ambiguous nature of these boundaries, highlighting how experienced frictions in factors which initially supported a household entering car sharing could later contribute to their exit. The characteristics which influence habituation in shared and privately-owned car arrangements are then considered along with the reasons why households expect to continue in car sharing.

Entering and exiting car sharing

Positive perceptions of the affordances, supporting habits and infrastructures, and compatible calculative habits, increase the likelihood of households opting for car sharing. Frictions subsequently experienced with these factors were multiple. Structural frictions included dissatisfaction with business models and the incompatibility of vehicle types with (desired) mobility practices. Emergent frictions arose from life events and new activities that entailed a rejigging of demands or a general recognition that participants had few, if any, uses for shared vehicles. The opportunity to use or buy a private car and the deep normalisation that underpins the affective lure of ownership are two additional exit-specific factors. While not directly equivalent, these are positioned alongside analogous but entry-specific factors of happenstance and ambiguous sentiments about cars. Although we discuss these factors separately, we stress that over time they often become entangled and interconnected.

Affordances of car-based arrangements

Cars form one element of an arrangement, which affords certain capacities to act and give meaning to actions. Car sharing arrangements bear some similarity to those made and performed around privately-owned cars. Both involve processes of assembling and adjusting to various elements including cars, drivers, passengers, roads, signs, traffic lights, personal items, insurance and the ability to drive a car. Some elements like booking, billing and support systems, cleaning and maintenance regimes, designated parking bays, smartphone apps or key

cards for access, are typically unique to shared car arrangements. Differences in the constitutive elements of shared and private arrangements have implications for the capacities they afford and the practices and habits they enable, constrain and reinforce.

The need for a carefully ordered car was important in shaping whether households might opt for a shared arrangement. Private car arrangements, in particular, are assembled and adjusted in a manner similar to a 'pocket of local order' (Ellegård and Vilhelmson 2004). A pocket supports particular activities, goals and projects and develops alongside the resources and constraints experienced by an individual or a household. They are specific spaces where everyday practices are conducted and habits develop. Equipping households with material objects and systems, they help address 'the double challenge of keeping favourable things and events within reach and unfavourable ones out of the immediate environment' (Schwanen 2007, 11). Cars assist with this challenge in three interrelated ways.

First, relative to other modes, cars in general and privately-owned ones in particular, tend to increase the speed and ease of movement between destinations. This is especially common for households with children (Dowling 2000). Annette explained how they were unable to imagine negotiating care and work-related travel commitments without a private car:

> [T]hat kindergarten was somehow not just around the corner [or] a … distance [manageable by public transport]. … Now [they are] big[ger] [it isn't] … so clumsy [and] … much easier to [travel] collectively [by public transport]. So [over] the last few years [we have but] before that I drove … to work (50-59 years old, B2C, Norway).

Car sharing became something parents were able to consider as their children gradually became more independent and the use of public transport, cycling and walking for chauffeuring and commuting became possible (McCarthy et al. 2019). The ability to easily chauffeur children between activities also became a significant consideration in deliberations associated with continuation and exiting:

> The convenience of having a [private] car to take them to friend's house and then go to swimming lessons, that seems to be what a lot of people do. A solution to [your children's] busy lives is to get a car (Matthew, 30-39 years old, B2C, London, UK).

Matthew, like Annette, highlights the deep normalisation of private car use as part of arrangements and practices of care (Dowling 2000; McLaren 2018). These collective habits

provide the socio-material context in which existing and evolving demands and practices are configured, performed and interpreted. This complicates approaches which only attempt to attribute change to key life and mobility events.

The above accounts further reveal that minor or major disruptions are not the only catalysts for participation in car sharing. Change can emerge out of more incremental and less discernible events. For parents like Annette, it was the cumulative 'micro-transitions' that their children underwent which modified the affordances of non-car-based alternatives like public transport (see also McCarthy et al. 2019). Micro-transitions included the development of more refined and proficient habits of locomotion which allowed children to move independently without a pram or reaching an age or size where a car seat was no longer mandatory or necessary. The anticipation and emergence of new interests also unfolded over time in ways with more or less apparent implications for continuation and exit.

Second, private cars make journeys more manageable by creating stable arrangements within an ever-changing environment. The additional time, effort and stress involved in assembling and disassembling similar levels of stability with car sharing regularly became a source of friction, contributing to households exiting:

> [Y]ou spent a long time retrieving them […], many times [carrying] a child seat, [a] stroller, [a] suit case and [a] bag. […] [Then w]hen the weekend is over … [you] have to park, take everything out, clean, wash and … deliver [it back]. It takes like two hours. There [are] some logistics […] and another type of stress [involved]. It's … so nice to just be able to pack [it all straight] in[to] [our own] car [now] (Henrik, 20-29 years old, P2P, Oslo, Norway).

These frustrations were most pronounced, as Henrik highlights, among those with young children and/or users of P2P or cooperative arrangements in Norway, who were responsible for washing and cleaning vehicles after their use.

Third, household practices, wants and needs create 'coupling constraints' which determine when, where and for how long individuals have to join other humans, objects and artefacts (Schwanen 2007). While private and shared car arrangements can help households overcome such constraints, the configuration and affordances of shared arrangements were seen as less suitable for households who frequently require a vehicle at short notice and for uncertain lengths of time. Steve's household, for instance, 'started thinking about [joining]' but with his

elderly mother living ‘140 miles away’ they wanted to ‘get there fairly quickly’ without ‘the anxiety of book[ing] the car’ (60-69 years, non-user, Oxford, UK). The timing and spacing of existing, new or anticipated demands such as care responsibilities, as well as, education, work and leisure activities, contributed to households not entering and eventually exiting an arrangement.

Supporting habits and infrastructures

Car sharing is facilitated by various skills (Kent and Dowling 2013), learned procedures and habits. Booking and using a shared vehicle, at a minimum, requires an individual who is able to drive a car, navigate an online booking system and use a card access system. Shared vehicles tended to be used only when they were more comfortable and convenient than alternatives or when a car was deemed necessary. Most participants possessed a range of habits and resided in locales which supported their car-lite lifestyles. The ability to make journeys by bicycle, on foot or public transport and to source everyday necessities was sustained by various transport systems, local amenities, and online ordering and delivery services. These factors do not guarantee the uptake of car sharing. Anette’s earlier account of using public transport with children demonstrated how the habits of those who make and perform an arrangement can reduce or enhance its capabilities (Gallagher 2017). Moreover, Anette and Steve’s explanations highlight how these affordances are shaped and modified by social relations (Gallagher 2017) such as commitments and caring responsibilities for more immediate or distant others.

Matthew emphasised how a sequence of disruptive and non-disruptive events contributed to his family’s entry into a car sharing. Emigrating from the US to Germany meant they could not afford a car. Bremen’s cycling infrastructure and culture enabled them to encounter and experiment with new ‘models’ of moving:

> You could see people just getting around with their kids in totally different ways […] whether it’s on a bike seat or [in] a trailer or the kids riding their own bike. [Cycling is] just how you do life there […] which was really helpful and interesting for us to see. […] [W]e got [a bike seat] at the Bremen flea market. […] That was a big change (30-39 years old, B2C, London, UK).

Despite having acquired these habits, being aware of car sharing and occasionally in need of a car, they were ineligible to join Bremen’s city-run scheme. It was not until they relocated to

London two years later that they started car sharing. Matthew's account reveals not only the importance of key events in mobility transitions but also less disruptive and cumulative changes that emerge as households adjust and respond to new settings, arrangements and events. Resulting habits can, over time, alter the demands that households put on the affordances and ordering of car-based arrangements.

Moving house abruptly or gradually altered the extent to which habits and infrastructures were able to facilitate ongoing use of shared arrangements. Recognising that an area was poorly serviced by their existing provider, some participants switched to a competitor. Dissatisfaction with a new provider's rules, pricing structures or service resulted in some households contemplating or deciding to exit. Others were planning to or had relocated to an area with no provision or lower densities of shared vehicles. There were also instances where a new neighbourhood lacked cycling infrastructure or public transport systems which had previously provided alternatives to private car ownership.

Costs and calculative habits

Cost was a key assessment criterion and factor. Prior experiences, particularly owning and renting cars, shaped the calculative habits through which car sharing costs were understood. Expenditures associated with private car ownership were typically grouped and assigned to different mental accounts (e.g., fuel, insurance, maintenance), which effected how they were perceived and experienced, and how frequently (e.g., weekly, monthly, yearly) they were evaluated. Households who gave up private cars typically did so after events helped to break through these habits of 'mental accounting' (Thaler, 1999) and made the full cost structure of ownership visible. Accidents in which vehicles were badly damaged or written-off and the anticipation or receipt of bills for maintenance, repair and parking permits were common examples. These events gave rise to brief or extended periods of uncertainty and deliberation over whether to repair or replace an ageing, damaged or written-off vehicle. Various households entered car sharing and gained a new appreciation of costs and how infrequently they required their private car during or following such periods.

Car sharing arrangements translate the primarily fixed costs of ownership into shared and variable costs directly attributable to time used and/or the distance travelled. Rates for shared vehicles also incorporate costs such as taxes, servicing, breakdown cover and insurance, which

are typically less visible to private car owners because they are distributed across multiple mental accounts. The general sentiment was that the costs per journey were often higher for shared vehicles than alternatives but assessments differed between households. Those who owned or had access to private vehicles tended to compare shared costs to the fuel costs likely incurred for the same journey. Maisie, for example, 'sometimes' borrows her neighbour's 'diesel' instead of the 'little green [shared] car' (40-49 years old, B2C, Oxford, UK). Intent on reducing her household's environmental impact, she often 'feel[s] conflicted' doing so but justifies it because it is typically 'the only car journey they make during the week' and it saves them 'twenty quid [£20]'. While she remains a committed member, Maisie's account highlights how structural frictions can limit regular use and work against habituation that might be supported by having a clear goal, a point returned to in the section on enduring car sharing.

Households who had never owned or had lived without a car for a considerable time, often hired vehicles from traditional rental agencies before entering into car sharing. This shaped some users' initial assessment of the benefits of car sharing significantly. Traditional hire generally meant travelling to a limited number of sometimes hard to reach locations, waiting to be served, providing proof of identity and filling in various forms. In comparison, once signed up, participants were able to book and access shared vehicles, often in close proximity, without any forms or down time.

After joining, car-free households made assessments based on preferences and the cost, time and effort of making the journey by other modes. Members of roundtrip B2C arrangements, which require vehicles to be picked-up and returned to the same location, lamented the cost of longer hires, especially when the vehicle sat idle for extended periods of their hire. This was attributed to the rates offered and the fact they only needed shared vehicles for more extraordinary journeys such as visiting family in hard to access places or holidays. Users appreciated that this made vehicles unavailable for others but felt there should be options available on the shared fleet. Some Norwegian households circumvented this issue by combining different sharing arrangements: 'I have a [B2C] membership that … is perfect to use when … moving a sofa and such things. … [I] use P2P when [we are] talking about days instead of hours. It complements very nicely' (Johan, 20-29 years old, P2P/B2C, Oslo, Norway). In other countries, frustrations over rates and the quality and size of vehicles meant

some households resorted to using traditional car rental on an as-needed or full-time basis or opted to borrow or purchase a private car.

Timing, happenstance and opportunity

Encountering car sharing at the right time and/or because of happenstance was also important in household deliberations. Many participants like Fien's neighbour encountered car sharing while deliberating over keeping an ageing car or purchasing a new one:

> We knew each other [and] someone's car broke [down]. We noticed … [our limited] use and [lack of] attach[ment] to [cars as] possession[s] … [and decided] … to share. [Eventually] we made [this] official [by becoming] affiliated with [the] association [for] shared car use. … [So it was] actually a bit of a coincidence [that we lived in] a street [of] like-minded people (Female, 40-49 years old, B2C, Rotterdam, Netherlands).

Often indifferent about owning, households considered sharing a way of realising their occasional need for car access. Certain circumstances made joining a relatively easy and stress-free. Car sharing membership and/or usage costs are included or subsidised in the rent, often in lieu of a parking space, in some new property developments in Sweden and the UK. Participants in Oxford, UK initially joined by donating their car in return for driving time and the profits made from sale once it was removed from the shared fleet. This enabled households to use 'their' car without worrying about insurance, maintenance and disposal while simultaneously feeling like they were helping make the scheme work.

The opportunity to use or buy a private car was often entangled and interconnected with other exit-related considerations. Certain demands on ordering and affordances and dissatisfaction with costs, as we have seen, meant some households borrowed and shared private vehicles owned by family, friends and neighbours. Such frictions and an eventual desire 'to own', contributed to James' (30-39 years old, B2C, Oxford, UK) 'opportunistic' purchase of the car he often borrowed when his friend 'wanted to sell it to get something bigger' for their growing family. In Norway, the attractiveness of policy incentives aimed at increasing adoption resulted in some participants purchasing electric vehicles.

Orientations and attachments towards cars

People can hold rather ambiguous or indifferent sentiments about cars (Paterson 2007) whilst also developing powerful affective and embodied attachments for and within cars (Sheller 2004). Participants' orientations and attachments revealed both the way a habit is reinforced and strengthened by other habits and can continue to function in subdued form even when apparently dormant or inactive. Indifferences towards cars appeared to correspond with extended periods in the past or leading up to entry, where lifestyle factors, a lack of necessity and the costs and difficulties of ownership meant participants had limited involvement with cars as drivers and/or passengers. These orientations were manifest in often overlapping ways. Some felt they had never developed much of a 'need' or 'desire' to own and use a car. Others had been or were reluctant users who considered the stress and demands associated with ownership and driving greater than alternative modes. Many also expressed concerns about the impact cars have on public space, air pollution and climate change. These sentiments were often apparent in explanations for why households continued sharing despite experiencing ongoing challenges.

It is widely accepted that shared vehicles are not intended to be a direct substitute for private car ownership (Kent and Dowling 2013). Previous childhood or adult experiences of privately-owned vehicles, highlighting the deep normalisation of ownership, still remained a common reference point. This raises the question of generational change as adults of the future are born in millennial families where car ownership is not the norm (Delbosc and Currie 2013). Currently, shared vehicles can recreate some of the embodied and sensory experiences and affordances associated with private cars but often the affective lure of ownership still remains. Lotte and her husband, for example, have been B2B members for ten years and have never owned a car. Shared vehicle access has increased their sense of freedom and flexibility, making it 'a lot easier' to 'leave the city'. Not ruling out continuing to share, Lotte admitted the 'idea of the private car has become more attractive':

> [It] makes you even more flexible, you can leave unexpectedly and … not … reserve in advance. [The] costs of [sharing] are still quite high if you use it more often and [we] actually do not leave the city as often as I would like (30-39 years old, B2C, Netherlands).

The antecedents of this 'idea' can be traced to various factors already elaborated above. Reflecting their particular 'stage of life', they recently moved to a 'larger', 'less centrally

located' house with their 'two small children'. Their location and children's ages have increased visits to friends and family and made journeys by public transport 'longer' and harder to negotiate. While their travel 'need [is not currently] big enough to do something about', even before the move it was 'sometimes difficult' as 'you need two car seats and the children are 'still too young to leave at home [while you] pick up a car'.

For those contemplating or actually exiting, a perceived lack of control and freedom over time became a significant source of friction. Users of for-profit car sharing arrangements, especially in the UK, were frustrated at times by the limited choice in vehicles available. Some would have preferred more needs-based access such as larger vehicles 'for long journeys and taking more stuff' (Nicola, 30-39 years old, B2C, Oxford, UK) or 'higher-end vehicles' for 'occasions when it would be good to show up in a nicer looking car' (Chris, 50-59 years old, B2C, Oxford, UK). In contrast, users of P2P in the Netherlands, Norway and Sweden enjoyed being able to choose from a wider selection of vehicles depending on their requirements.

Having to book beforehand, especially on weekends and holiday periods, also contributed to a perceived lack of control and freedom. Estimating the length of a booking in advance and then not necessarily being able to adjust it was another source of discontent: 'You have [to] set a stopwatch [and] someone else is waiting for the car. [So if] you are in the middle of it [and] want it two hours longer all of a sudden … you can't. … We always tr[ied] to take a little margin … but it's not freedom [and] we [had had] enough of [the] stress' (Ellen, 40-49 years old, Sweden). Other households chose to remain, at least initially, in a scheme despite rarely using it or purchasing a car because they derived some value from their membership. Paying for ongoing access increased their 'motility' or the potential actions they could take, even if they subsequently rarely used these arrangements (Kaufmann, Bergman, and Joye 2004). Two implications follow. First, while some households exit one arrangement to enter into another, others may remain simultaneously in both shared and private car arrangements. Second, as we elaborate now, the fact that most households rarely use schemes means frequent repetition is absent with due consequences for the strengthening of habits.

Enduring car sharing

The willingness of users to experiment and negotiate new arrangements and invariably cope with arising issues are significant to the success or failure of car sharing (Kent and Dowling

2018) and other alternative mobility practices (Normark et al. 2018). This reliance upon users is of course not unique to alternative mobility practices. Drivers of privately-owned cars remain a principal element of the automobility regime (Urry 2004; Paterson 2007). A key difference between shared and privately-owned arrangements, however, is the extent to which the existing elements of automobility (Kent and Dowling 2013) influence the process and strength of habituation. Four interrelated characteristics, reported in Table 2, emerge from our empirical materials. First, effort is shaped by the cognitive, physical and practical demands that surround a particular arrangement. Second, mobility-related needs, wants and desires are influenced by the actual or perceived demands associated with regular activities and journeys and emotional and embodied attachments to cars. Third, *investments and involvement* are associated with the responsibilities the user has for purchasing, operating and maintaining the vehicle, the financial and time commitments these tasks entail, and visibility of the costs involved. Fourth, the *habits and infrastructures* required to support the arrangement or practice.

[Insert Table 2. about here]

Compared to owning, car sharing generally involves greater effort, relies on more objects, technologies, infrastructures and competencies, entails lower levels of financial investment and personalisation, makes costs more visible, generates weaker attachments, and is performed less frequently (Table 2). Reflecting these qualities, the habits of car sharing are often fragile and not as deeply ingrained as those associated with ownership. The boundary between continuing and exiting a car sharing arrangement, as a consequence, is fuzzy and porous. The reasons why people see themselves continuing or, reflecting the work it entails, 'enduring' with car sharing are now explored. The first two sets of explanations play out at the level of the everyday practices~~,~~ and encounters, whereas the latter two transcend the here and now and are more explicitly future-oriented. Enduring and exiting correspondingly are not one-off events but rather processes involving multiple temporalities.

The ability of sharing arrangements to facilitate occasional car access was one reason many continued. Assessments of the ease, cost and pain of car sharing were shaped by everyday practices and encounters in three ways. Previous experiences of the challenges and difficulties associated with owning or renting vehicles including the costs, time and resources involved, provided users with a comparative reference point:

> It's quite a worry-free way of using a car. [Y]ou don't have to worry about it getting damaged [when parked], finding a parking spot, booking maintenance and insurance. … That's … probably the biggest benefit, not having to think about it at all unless you need to [book and] use the car (Casper, 30-39 years old, B2C, Sweden).

Other households gradually learned to assess costs incurred sharing on a cumulative rather than discretionary basis: 'We have chosen not to think about how much [it costs] at a time but to view it per year. Otherwise it would seem very expensive [to spend], for example, €80 to visit friends' (Lotte, 30-39 years old, B2C, Netherlands). Second, the facilitative role of shared vehicles was evaluated in relation to experienced or perceived affordances of other modes. They were often seen as particularly useful for journeys with bulky items or excursions to remote locations. Last, ongoing shared vehicle use was supported by the fact that alternatives to the private car continued to more or less satisfactorily meet their everyday mobility needs.

Alongside facilitation, everyday events served to positively reinforce previous understandings and help participants identify new explanations for why they share rather than own a (second) car (see Laakso 2017). David, for example, had no idea what his 'street looked like during the day' until he 'started working from home':

> I suddenly … realise[d] how much traffic … travel[s] ridiculously fast down tiny … streets…. I … [then] understood why … car[s] … parked outside my house … had been damaged. … [E]very time I heard a transit [van] … I'd be thinking 'Oh god there goes another wing mirror, that's gonna cost me…' (50-59 years old, B2C, Oxford, UK).

These experiences contributed to his household's decision to forgo a private car, join a B2C sharing arrangement and invest in a cargo bike. Now they serve as another justification for why they share rather than own a car. Similarly, observing neighbours repeatedly digging cars out of the snow during the winter was another everyday event that for users in Sweden and Norway reinforced why they gave up private ownership.

The commitment of users was strengthened by the gradual discovery of the unique affects and new possibilities these arrangements could generate and afford. Evi enjoys the 'community feeling' and 'connection[s]' that have emerged among those participating in her neighbourhood scheme (50-59 years old, B2C, Netherlands). Erling has come to recognise that sharing allows

his household to more easily reconfigure how a specific journey is made when new or unexpected demands arise:

> If you buy a car … it has to work for everything. … I am very fond of [having] the freedom [to book] a small or a large car. … [If] we buy … something on the fly we just book … the … big van and everything works. Never would have worked if we weren't … car [sharing] (40-49 years old; B2C, Norway).

Some users gradually realised that rather than driving a private or rental car to a holiday or work destination, they can instead catch a train and then hire a shared car upon arrival. This enables them to retain the flexibility of a car while avoiding the demands and stresses of an otherwise long drive. Others have learned to appreciate arrangements with dedicated parking bays in areas where parking is severely restricted or in high demand.

The final two explanations are explicitly future-oriented. Having a clear goal, exemplified by a conscious decision to live a car-lite lifestyle or not be a two-car household, is the first. These aspirations were generally linked to concerns about the impacts of private car ownership. Realising a car-lite lifestyle, however, requires significant planning and co-ordination:

> [W]e don't depend on [a] car at all. It is something we actively want. It is not something that has just become so. … [W]e have been actively searching for a life where … all the logistics should be as simple as possible (Thomas, 40-49 years old, B2C, Norway).

For many participants, the implementation of these plans, only became possible when the demands on the affordances and ordering of the car changed as household members switched careers, children grew up and/or moved out and couples transitioned into retirement. Having such a clear goal can help to reinforce car sharing habituation. The difficulty was that having established car-lite lifestyles, especially before joining, households found limited uses for shared vehicles:

> [I]t is just such a habit … [that] we do not think car at all. … [O]thers certainly have [it] much more in mind. […] So we don't use the [shared] car often now. We used it to buy some furniture and stuff but it's not [something we do] much (Ove, 40-49 years old, B2C, Norway).

Such infrequent use appeared to limit the reinforcing effects that repetition might have otherwise have had on habituation.

Second, there was a shared sentiment that car sharing should or would become more normal. Participants saw themselves as early adopters of a practice that would perhaps become the norm amongst their generation:

> [E]veryone wants to live centrally … and it is desirable that … valuable [land is not] taken up by parking, so I think there will only be more and more [car sharing]. [With] more investments … in public transport and electric bicycles … you [might see a] change [in] attitude. Our generation may start to become more inclined to share [rather than] own (Erik, 20-29 years old, B2C, Sweden).

Others, echoing Erik's sentiments, considered car sharing as one mechanism through which the social and environmental impacts of private ownership could be reduced. They saw themselves as setting an example, especially for their children and relatives, that it was possible to live a normal and enjoyable life without owning a car (see McLaren 2018).

Conclusion

Shared mobility systems are considered to be one of a number of elements that will disrupt the primacy of the car. Focusing on processes of entering, enduring and exiting, this paper has examined how practices and habits co-evolve with, strengthen and weaken shared car arrangements. Current habits of car sharing are fragile and not as deeply ingrained as those associated with ownership. This is significant given high expectations around shared mobility and highlights the need for additional scholarship on the durability of car sharing and similar arrangements (e.g., bicycle-, ride- and e-scooter-sharing and Mobility-as-a-Service (MaaS)). Effort, mobility-related needs, wants and desires, investments and involvement, and supporting habits and infrastructures, have been identified as four interrelated characteristics which contribute to the process and strength of habituation. Minor and major disruptions like a car breaking down or the birth of child can reinforce, modify or unsettle habits of car sharing and ownership. Less forceful and non-abrupt events like packing and unpacking shared vehicles, new interests and earlier periods of living without a car, when part of a sequence or series can also give rise to significant change in everyday mobility. Future research could further explore the applicability of these interrelated characteristics, disruptions, and events, elsewhere and for other types of shared arrangements. While similarities with car sharing may be found for those arrangements, our work reinforces that the enclosed space and affordances of cars (Sheller

2004; Wells and Xenias 2015) and the supporting habits and infrastructures they require, ensure car sharing remains a distinct form of sharing.

The fragility of shared car arrangements raises further questions about the transformative potential of innovations like shared mobility, Mobility-as-a-Service (MaaS) and automated vehicles (AVs) and the extent to which elements might be added, removed or reconfigured to address the structural and emergent frictions we have identified. It is unclear whether MaaS schemes, which bundle shared systems with traditional public transport services via a single digital platform, or shared AVs, can replicate the speed, ease and flexibility that private cars afford households negotiating complex spatial and temporal daily routines of work, care and leisure. A trial in Ghent, Belgium, for example, found MaaS was a car-complement rather than substitute, especially when it came to chauffeuring children to school and leisure activities (Storme et al. 2020). This is not surprising given that the additional time and effort involved in accessing, assembling and disassembling shared vehicles with car seats and personal items was a common friction experienced particularly by families. Similarly, business models, rules and pricing do not always align with households wanting infrequent access for extraordinary journeys to visit friends and family at weekends or for holidays (Svennevik, Julsrud and Farstad 2020). Some households in our sample experienced such constraints and issues as necessary trade-offs or managed to negotiate them by participating in multiple schemes or via informal sharing of cars. Less committed members, however, gradually re-evaluated or exited.

Limited and skewed demand for shared vehicles are often cited as issues which make it difficult to establish long-term and commercially viable business models (Lagadic et al. 2019; Wells et al. 2020). This has contributed to diversification, with some companies experimenting with B2C and B2B hybrid models, and others offering complementary services including ridesharing, P2P car rental and B2C leasing (Guyader and Piscicelli 2019). This latter case shows the important role that service provider strategies play in stabilising, ordering and changing shared arrangements. In this context, incumbent vehicle manufacturers (e.g., Daimler, BMW, Volvo, Ford) and car rental organisations (e.g., Avis, Enterprise, Europcar, Sixt) have acquired existing operators and/or established (and closed) their own car sharing subsidiaries. Significantly, car sharing, (automated) ride-sharing and ride-hailing are examples of narrower Automobility-as-a-Service (AaaS) platform business models that might be provided independently of MaaS (Wells et al. 2020). This ‘may allow the perpetuation of the

automotive industry and mass automobility' and 'assist the industry in resisting transformative change' (Wells et al. 2020, 8).

Arrangements, habits and practices, however, are not static entities and the deep normalisation of private car ownership might change as older, car-dependent generations are replaced by digitally-enabled, multi-modal, and environmentally conscious, future generations (McLaren 2018; Delbosc and Currie 2013). More importantly, policy-makers, land-use and city planners can destabilise, reorder and change the elements that currently support private cars in favour of shared mobility through investments in public transport, walking and cycling infrastructures, restrictive private parking policies, vehicles taxes, the introduction of congestion charging and low-emission zones (LEZs) (Kent and Dowling 2013; Arcidiacono and Duggan 2020). In doing so, they should priortise enhancing the durability of shared mobility arrangements and habits.

Acknowledgements

We gratefully acknowledge the research participants who generously gave up their time to participate in the research in Norway, the Netherlands, Sweden and the UK. We also wish to recognise the funding from the Research Council of Norway which made this collaboration possible, and Johannes Kester, Elsbeth Wright and two anonymous reviewers for their valuable suggestions and guidance on earlier versions of this manuscript.

Funding

This paper is an output of TEMPEST research project funded by ENERGIX-program of the Research Council of Norway [Project Number: 255430]. Further preparation of the manuscript by B. J. Doody has been supported financially by a British Academy Postdoctoral Fellowship [Grant Reference: PF2\180070].

References

Akyelken, Nihan, David Banister, and Moshe Givoni. 2018. "The sustainability of shared mobility in London: The dilemma for governance." *Sustainability* 10 (2):420. doi: https://doi.org/10.3390/su10020420

Arcidiacono, Davide, and Mike Duggan. 2020. Sharing mobilities: Questioning our right to the city in the collaborative economy. Abingdon: Routledge.

Bissell, David. 2014. "Habits." In *The Routledge handbook of mobilities*, edited by Peter Adey, David Bissell, Kevin Hannam, Peter Merriman and Mimi Sheller, 483-92. Abingdon: Routledge.

Bissell, David, Phillip Vannini, and Ole B. Jensen. 2017. "Intensities of mobility: kinetic energy, commotion and qualities of supercommuting." *Mobilities* 12 (6):795-812. doi: 10.1080/17450101.2016.1243935.

Callon, Michel. 2005. "Why virtualism paves the way to political impotence." *Economic Sociology European Electronic Newsletter* 6 (2):3-20.

Chatterjee, Kiron, Geoff Andrews, Miriam Ricci, and Graham Parkhurst. 2013. "Qualitative insights into the effect on travel behavior of joining a carshare." *Transportation Research Record* 2359 (1):76-84. doi: 10.3141/2359-10.

Cochoy, Franck. 2014. "A theory of 'agencing': On Michel Callon's contribution to organizational knowledge and practice." In *Sociology, social theory, and Organization Studies*, edited by Paul Adler, Paul du Gay, Glenn Morgan and Mike Reed, 106-24. Oxford: Oxford University Press.

Delbosc, Alexa, and Graham Currie. 2013. "Causes of youth licensing decline: A synthesis of evidence." *Transport Reviews* 33 (3):271-90. doi: 10.1080/01441647.2013.801929.

Dewey, John. 1920. *Reconstruction in philosophy*. New York: Henry Holt and Company.

Dewey, John. 1922. *Human nature and conduct*. New York: Henry Holt and Company.

Dill, Jennifer, and Nathan McNeil. 2021. "Are shared vehicles shared by all? A review of equity and vehicle sharing." Journal of Planning Literature: 36 (1):5-30. doi: 10.1177/0885412220966732.

Doody, Brendan J. 2020. "Becoming ‘a Londoner’: Migrants’ experiences and habits of everyday (im)mobilities over the life course." *Journal of Transport Geography* 82:102572. doi: https://doi.org/10.1016/j.jtrangeo.2019.102572.

Dowling, Robyn. 2000. "Cultures of mothering and car use in suburban Sydney." *Geoforum* 31 (3):345-53. doi: http://dx.doi.org/10.1016/S0016-7185(99)00048-2.

Dowling, Robyn, and Sophia Maalsen. 2020. "Familial mobilities beyond the private car: electric bikes and car sharing in Sydney, Australia." *Applied Mobilities* 5 (1):53-67. doi: 10.1080/23800127.2019.1571658.

Ellegård, Kajsa, and Bertil Vilhelmson. 2004. "Home as a pocket of local order: Everyday activities and the friction of distance." *Geografiska Annaler: Series B, Human Geography* 86 (4):281-96. doi: 10.1111/j.0435-3684.2004.00168.x.

Gallagher, Shaun. 2017. *Enactivist interventions: Rethinking the mind*. Oxford: Oxford University Press.

Greene, Mary, and Henrike Rau. 2018. "Moving across the life course: A biographic approach to researching dynamics of everyday mobility practices." *Journal of Consumer Culture* 18 (1):60-82. doi: 10.1177/1469540516634417.

Guyader, Hugo, and Piscicelli, Laura. 2019. "Business model diversification in the sharing economy: The case of GoMore." *Journal of Cleaner Production* 215:1059-1069. doi: https://doi.org/10.1016/j.jclepro.2019.01.114

Hagberg, Johan. 2016. "Agencing practices: a historical exploration of shopping bags." *Consumption Markets & Culture* 19 (1):111-32. doi: 10.1080/10253866.2015.1067200.

Jain, Taru, Marilyn Johnson, and Geoffrey Rose. 2020. "Exploring the process of travel behaviour change and mobility trajectories associated with car share adoption." *Travel Behaviour and Society* 18:117-31. doi: https://doi.org/10.1016/j.tbs.2019.10.006.

Kaufmann, Vincent, Manfred Max Bergman, and Dominique Joye. 2004. "Motility: mobility as capital." *International Journal of Urban and Regional Research* 28 (4):745-56. doi: https://doi.org/10.1111/j.0309-1317.2004.00549.x.

Kent, Jennifer, Robyn Dowling, and Sophia Maalsen. 2017. "Catalysts for transport transitions: Bridging the gap between disruptions and change." *Journal of Transport Geography* 60:200-7. doi: https://doi.org/10.1016/j.jtrangeo.2017.03.013.

Kent, Jennifer L., and Robyn Dowling. 2013. "Puncturing automobility? Carsharing practices." *Journal of Transport Geography* 32 (0):86-92. doi: http://dx.doi.org/10.1016/j.jtrangeo.2013.08.014.

———. 2018. "Commercial car sharing, complaints and coping: Does sharing need willingness?" *Urban Policy and Research* 36 (4):464-75. doi: 10.1080/08111146.2018.1486297.

Kesselring, Sven, Malene Freudendal-Pedersen, and Dennis Zuev, eds. 2020. Sharing mobilities: New perspectives for the mobile risk society. New York: Routledge.

Laakso, Senja. 2017. "Giving up cars - The impact of a mobility experiment on carbon emissions and everyday routines." *Journal of Cleaner Production* 169:135-42. doi: http://doi.org/10.1016/j.jclepro.2017.03.035.

Lagadic, Marion, Alia Verloes, and Louvet, Nicolas. 2019. "Can carsharing services be profitable?" Transport Policy 77: 68-78. doi: https://doi.org/10.1016/j.tranpol.2019.02.006

Lanzendorf, Martin. 2003. "Mobility biographies. A new perspective for understanding travel behaviour." In *Moving through nets: The physical and social dimensions of travel: 10th International Conference on Travel Behaviour Research*. Lucerne, Switzerland.

Le Vine, Scott, Alireza Zolfaghari, and John Polak. 2014. "Carsharing: Evolution, challenges and opportunities. 22nd ACEA Scientific Advisory Group Report." In. Brussels: European Automobile Manufacturers Association (ACEA).

Martin, Elliot, and Susan A. Shaheen. 2011. "The impact of carsharing on public transit and non-motorized travel: An exploration of North American carsharing survey data." *Energies* 4 (11). doi: 10.3390/en4112094.

McCarthy, Laura, Alexa Delbosc, Graham Currie, and Andrew Molloy. 2019. "Trajectories and transitions: mobility after parenthood." *Transportation*. doi: 10.1007/s11116-019-10051-5.

McLaren, Arlene Tigar. 2018. "Parent–child mobility practices: revealing 'cracks' in the automobility system." *Mobilities* 13 (6):844-60. doi: 10.1080/17450101.2018.1500103.

Normark, Daniel, Franck Cochoy, Johan Hagberg, and Hélène Ducourant. 2018. "Mundane intermodality: a comparative analysis of bike-renting practices." *Mobilities* 13 (6):791-807. doi: 10.1080/17450101.2018.1504651.

Paterson, Matthew. 2007. *Automobile politics*. Cambridge: Cambridge University Press.

Plyushteva, Anna, and Tim Schwanen. 2018. "Care-related journeys over the life course: Thinking mobility biographies with gender, care and the household." *Geoforum* 97:131-41. doi: https://doi.org/10.1016/j.geoforum.2018.10.025.

Rau, Henrike, and Richard Manton. 2016. "Life events and mobility milestones." *Journal of Transport Geography* 52:51-60. doi: https://doi.org/10.1016/j.jtrangeo.2016.02.010.

Sattlegger, Lukas, and Henrike Rau. 2016. "Carlessness in a car- centric world: A reconstructive approach to qualitative mobility biographies research." *Journal of Transport Geography* 53: 22-31. doi: https://doi.org/10.1016/j.jtrangeo.2016.04.003

Scheiner, Joachim. 2007. "Mobility biographies: Elements of a biographical theory of travel demand." *Erdkunde* 61 (2):161-73.

Schwanen, Tim. 2007. "Matter(s) of interest: Artefacts, spacing and timing." *Geografiska Annaler: Series B, Human Geography* 89 (1):9-22. doi: 10.1111/j.1468-0467.2007.00236.x.

Schwanen, Tim, David Banister, and Jillian Anable. 2012. "Rethinking habits and their role in behaviour change." *Journal of Transport Geography* 24:522-32. doi: 10.1016/j.jtrangeo.2012.06.003.

Sheller, Mimi. 2004. "Automotive emotions: Feeling the car." *Theory, Culture & Society* 21 (4-5):221-42. doi: 10.1177/0263276404046068.

Spinney, Justin, and Wen- I. Lin. 2018. "Are you being shared? Mobility, data and social relations in Shanghai's Public Bike Sharing 2.0 sector." *Applied Mobilities* 3 (1):66-83. doi: 10.1080/23800127.2018.1437656.

Storme, Tom, Jonas De Vos, Leen De Paepe, and Frank Witlox. 2020. "Limitations to the car-substitution effect of MaaS. Findings from a Belgian pilot study." Transportation Research Part A: Policy and Practice 131: 196-205. doi: https://doi.org/10.1016/j.tra.2019.09.032.

Svennevik, Elisabeth M. C., Tom Erik Julsrud, and Eivind Farstad. 2020. "From novelty to normality: reproducing car-sharing practices in transitions to sustainable mobility." *Sustainability: Science, Practice and Policy* 16 (1): 169-183. doi: https://doi.org/10.1080/15487733.2020.1799624.

Thaler, Richard H. 1999. "Mental accounting matters." *Journal of Behavioral Decision Making* 12 (3):183-206. doi: https://doi.org/10.1287/mksc.1070.0330.

Urry, John. 2004. "The 'system' of automobility." *Theory, Culture & Society* 21 (4-5):25-39. doi: 10.1177/0263276404046059.

Wells, Peter, and Dimitrios Xenias. 2015. "From 'freedom of the open road' to 'cocooning'" *Environmental Innovation and Societal Transitions* 16:106-19. doi: http://dx.doi.org/10.1016/j.eist.2015.02.001.

Wells, Peter, Xiaobei Wang, Liqiao Wang, Haokun Liu, and Renato Orsato. 2020. "More friends than foes? The impact of automobility-as-a-service on the incumbent automotive industry." Technological Forecasting and Social Change 154: 119975. doi: https://doi.org/10.1016/j.techfore.2020.119975.

Table 1. The characteristics of participants interviewed from households in the Netherlands, Norway, Sweden and the UK. Abbreviations: B2C (Business-to-consumer); B2B (Business –to-business); P2P (Peer-to-peer).

Characteristic	Netherlands		Norway		Sweden		United Kingdom		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Age 18-29	1	14.3	8	16.0	1	8.3	0	0.0	10	11.2
Age 30-39	1	14.3	24	48.0	5	41.7	5	25.0	35	39.3
Age 40-49	2	28.6	10	20.0	2	16.7	4	20.0	18	20.2
Age 50-59	2	28.6	6	12.0	2	16.7	6	30.0	16	18.0
Age 60-69	1	14.3	2	4.0	2	16.7	4	20.0	9	10.1
Age 70+	0	0.0	0	0.0	0	0.0	1	6.7	1	1.1
Male	4	57.1	26	51.0	6	50.0	14	70.0	51	55.6
Female	3	42.9	25	49.0	6	50.0	6	30.0	39	44.4
Main mode of mobility										
Active travel (cycle/walk)	3	37.5	12	28.6	4	30.8	16	80.0	35	42.2
Public transport	4	50.0	27	64.3	8	61.5	4	20.0	43	51.8
Private vehicle	0	0.0	2	4.8	1	7.7	0	0.0	3	3.6
Work vehicle	0	0.0	1	2.4	0	0.0	0	0.0	1	1.2
Shared vehicle	1	12.5	0	0.0	0	0.0	0	0.0	1	1.2
Private car owner										
Yes	2	28.6	7	18.4	4	33.3	5	27.8	18	24.0
No	5	71.4	31	81.6	8	66.7	13	72.2	57	76.0
Household structure										
Couple household	2	28.6	18	46.2	4	33.3	8	44.4	32	42.1
Couple with child/ren	0	0.0	15	38.5	1	8.3	0	0.0	16	21.1
Single with child/ren	1	14.3	2	5.1	2	16.7	2	11.1	7	9.2
Living alone	3	42.9	4	10.3	5	41.7	8	44.4	20	26.3
Shared household	1	14.3	0	0.0	0	0.0	0	0.0	1	1.3
Business Model										
B2C (Round-trip)	3	42.9	28	68.3	6	50.0	18	90.0	55	68.8
B2C (Free-floating)	4	57.1	0	0.0	0	0.0	1	5.0	5	6.3
B2C/B2B	0	0.0	0	0.0	0	0.0	1	5.0	1	1.3
P2P	0	0.0	13	31.7	6	50.0	0	0.0	19	23.8

Table 2. Some characteristics of owning and sharing a car which influence the process and strength of habituation.

Private Ownership	**Car Sharing**
1. Effort associated with the arrangement	
• Often limited conscious consideration • Relatively limited negotiation to gain access • Travel to/from typically closely parked car by foot • Car is pre-ordered and pre-equipped with items which can be removed as required or desired • Un/lock car with keys or fob • Adjustments to suit personal needs are minimal • Park the car in (un)allocated space	• Conscious decision to use the car • Availability and duration negotiated around multiple users through booking system • Travel to/from parked car by foot, bicycle, or public transport • Bring and remove all items for use or specific activities • Un/lock using a smartphone app/ key card or keys obtained from/returned to drop box or owner • Adjust car (i.e., seat, mirror, entertainment) to suit personal needs • Ensure leave vehicle in satisfactory state for other users • Park the car in (un)allocated space
2. Mobility-related needs, wants and desires	
• Car is required or considered necessary for regular journeys and activities • Vehicle/s generally purchased to serve multiple purposes • Car-based attachments to and meanings based on flexibility, freedom, security and enjoyment	• Needs or wants for a car are often limited • Cars typically required on an ad-hoc basis to complete particular activities or tasks • Vehicles and/or scheme (B2C; P2P) generally selected to fulfil specific purposes or needs • Attachments and meanings partially replicate but also diverge from those associated with ownership
3. Investments and involvement	
• Generally responsible for overseeing and covering the costs associated with vehicle	• Few responsibilities except for refuelling, tidying and, in rare instances, cleaning and washing

• Significant ‘sunk’ costs including vehicle, insurance, registration, taxes, maintenance and parking • Total costs not easily visible as: a) initial outlay is seen as distinct from ongoing operating costs; and b) many costs are either one-off annual (e.g., insurance, registration) or irregular (e.g., maintenance, repair)	• Generally, pay as you go except for a one-off joining fee and/or periodic fees • Total use costs are made visible on a regular basis • B2C and B2B users are often conscious of paying for ‘idle’ time during a booking
4. Supporting habits and infrastructures	
• Ability to drive a car • Car-related infrastructure and systems	• Ability to drive a car • Prepared to experiment and negotiate and cope with issues that arise using car sharing • Ability and systems to support the completion of regular journeys and activities without a car