

Destabilising Automobility? The Emergent Mobilities of Generation Y

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Abstract

This paper uses empirical material gathered with young adults in New Zealand to examine a potential sustainability transition-in-practice. It draws from two frameworks; the actor-centred Energy Cultures Framework to explore mobility behaviours, and the multi-level perspective (MLP) to situate behaviour change within the socio-technical transitions literature. The MLP has traditionally been used to analyse historical transitions (e.g. from the horse and cart to the motor vehicle), but in this paper, it is used to explore an on-going change trend; the emergent mobilities of young adults who appear to be aspiring for different types of mobility. A series of mobility trends are described, which emerged from a programme of qualitative interviews (n=51). The material culture, norms and practices that constitute these trends are articulated. These are then considered through the lens of the MLP. The evidence points to emergent trends of multimodality that, if leveraged upon and supported, could contribute to a systemic sustainability transition.

Keywords: Automobility, Mobility Trends, Generation Y, Multi-Level Perspective (MLP), Sociotechnical transitions, Energy Cultures framework.

1. INTRODUCTION

The 21st Century is on the move (Adey et al. 2014). The flows of people, ideas and objects continues to increase in pace and intensity. However, these mobility patterns are unevenly spread across and within countries resulting in a series of ethical, environmental and socio-cultural issues. The automobile is one of late modernity's most highly recognisable and contested artefacts (Beckmann, 2001); an iconic commodity of the consumer age (Soron, 2009). It is also regarded as *the* hegemonic class of contemporary everyday mobility in most industrialised countries. This has resulted in mobility systems designed to support and reinforce automobile dependency, often to the detriment of alternative transport modes (Litman & Laube, 2002; Martin, 2009).

Yet despite evidence of stabilisation characteristics (Geels, 2012) and resistance to change (Wells & Xenias, 2015; Schwanen, 2016), a counter narrative has emerged. Contesting the current automobility paradigm are reported variations to generation Y (1980-2000) mobilities when compared to the mobility trends of older generations (Frändberg & Vilhelmson, 2011). In some, but not all, industrialised countries, reports are emerging of decreased automobility by generation Y, characterised by decreasing rates of licensing, vehicle kilometres travelled (VKT) and car ownership (See: Delbosc & Currie, 2013).

The importance of a transition away from automobility relates to the negative externalities of the current system. For instance, carbon (CO₂) emissions are adversely impacting the global climate, and the transport sector is struggling to achieve the required reductions in energy consumption and CO₂ emissions (Banister, 2011). Land transport-related greenhouse gas (GHG) emissions have more than doubled since 1970, increasing at a faster rate than any other energy end-use sector (Sims & Schaeffer, 2014). As transport growth is outweighing

mitigation measures, reducing global GHG emissions presents a major challenge (Sims & Schaeffer, 2014). The current regime is also highly oil dependent. In 2010, 53% of global primary oil consumption was used to meet 94% of transportation total energy demands (Sims & Schaeffer, 2014), thus exposing actors at all scales to supply and price volatility.

Socio-technical systems consist of networks of actors and institutions, material artefacts and knowledge (Geels, 2004). A transition within socio-technical systems involves a fundamental shift amongst these different dimensions (Markard et al., 2012). In this paper, the mobility trends of generation Y are examined in terms of their potential contribution to a large-scale socio-technical transition towards a more sustainable and equitable mobility system. Using qualitative findings from 51 interviews conducted in New Zealand, a selection of heterogeneous generation Y mobility trends are viewed through the Energy Cultures framework, and the multi-level perspective (MLP). The integration of these approaches to understanding generation Y mobilities as a potential sustainable socio-technical transition, forms the main contribution of this paper. In order to achieve this, this paper responds to three questions: (1) What examples of *non-traditional* mobility trends are evident? (2) How do these trends in material cultures, norms and practices of mobility contrast from the dominant mobility paradigm? (3) What insights can the MLP provide to understand the destabilising characteristics of emergent mobility trends?

1.1 Automobility

Mobilities research is a popular field of investigation, research methodology (mobile methods) and lens through which to examine socio-cultural phenomena. This has encompassed both global movements of people, objects, capital and information as well as localised daily transportation as part of everyday life (Hannam et al., 2006). In this research,

the focus is on mobilities enabled by the automobile and its systems: automobility. Across the global North, the automobile, as an artefact of automobility (Beckmann, 2001), has received widespread adoption, and become more than a means of transportation (Conley, 2009). In Global South, this trend is being replicated, not just in the uptake of motorised vehicles and mobilities, but through the systems of mobility including rapid changes to urban environments. In acknowledging the differences in mobility practices and demands globally, the focus of the current research is on generation Y change trends in the global North.

In contrast to the process of mobilities-by-automobile, automobilities refers to the complex and expanding system of which the experience of driving is one part (Conley & McLaren, 2009), and a system which both allows the opportunity to drive whilst also enforcing the necessity to drive (Paterson, 2007). While it took technological innovations and novel business structures and practices to develop the automobile and make it affordable on a mass scale (Sheller & Urry, 2000), it also required socio-cultural reorganisation of social life (Gunn, 2013) and socio-technical transformation, responding to political and industrial stimuli. This enabled the auto-revolution, through which the car system evolved into a way of life (Urry, 2007). The same demands may, therefore, be required to achieve a sustainable socio-technical mobility transition.

The sustainable mobility paradigm (Banister, 2008) is presented as an alternative to the current auto-centric system. Banister (2008) argues for greater attention to a range of behavioural, technological and policy approaches and calls for innovative thinking around the current urban form. The characteristics of a sustainable transport system include; a reduced need to travel through **travel substitution**, transport policy measures facilitating **modal shift**, land use policy measures facilitating **distance reduction**, and **increased efficiency** through

technological innovation (Banister, 2008), known as the Avoid-Shift-Improve model (Sims & Schaeffer, 2014).

This paper is focused primarily on the behavioural aspects of the sustainable mobility paradigm: the 'need to reduce travel' through decreasing licensing, car ownership and VKT of generation Y. However, the components of the policy, behaviour and innovation triad do not exist in isolation from one another. Importantly, policy and innovation will support or hinder modes through infrastructural decisions and funding priorities, discussed further later in this paper. For the purpose of this paper, sustainable mobility includes environmentally, socially and economically sustainable mobility systems which provide equitable access to low carbon mobility, prioritising low-carbon modes, where possible.

1.2 Generation Y Mobilities

Travel and mobility patterns differ within and between geographic, socio-cultural and socio-economic communities. Yet young people's experiences of mobility are relatively under researched (Barker et al. 2009). Neoliberal social and economic reforms have effected profound changes for young people. For instance, home ownership is increasingly out of reach for generation Y. How their current, and life course mobilities will be affected by these changes is not well understood. Likewise, the diverse way youth and adulthood is experienced in different socio-cultural and socio-economic communities requires further examination.

Reports of changing automobility trends for generation Y have emerged across the global North: the USA, Canada, Australia, Norway, Sweden, the UK, Japan, South Korea (Delbosc & Currie, 2013; Kuhnimhof et al., 2012; Sivak & Schoettle, 2012). In 9 of 14 countries analysed by Delbosc & Currie (2013), licensing rates were in decline, while 5 countries (Finland, Israel, The Netherlands, Switzerland and Spain) reported business-as-usual increases to generation

Y's licensing trends. In New Zealand, there has been a decline in the percentage of 15-34 year olds with a full driver's licence between 1990 and 2014¹ (NZ Ministry of Transport, 2014; Hopkins & Stephenson, 2016). Average national vehicle kilometres travelled (VKT) has been static for the 15-24 and 25-34 age groups (NZ Ministry of Transport, 2014; Hopkins & Stephenson, 2016), but these data are likely to disguise wide regional variability.

As with all socio-technical systems, drivers of change will include "lateral alignments, unexpected linkages, thresholds and tipping points" (Geels, 2012: p.474), which require greater academic attention. Nevertheless, the reported change trends are in contrast with national road building and town planning agendas in New Zealand, and other industrialised countries, which are traditionally focused on growth in private automobile use.

2. THEORETICAL PERSPECTIVES

2.1 The Energy Cultures Framework

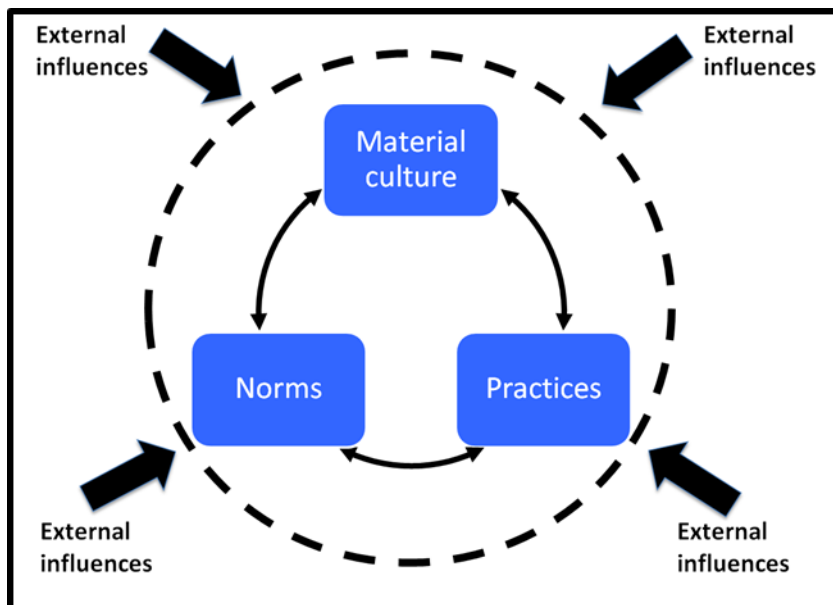
The Energy Cultures Framework was introduced by Stephenson et al (2010; 2015) as a way to help understand energy behaviours at different scales and in different domains, and to bring together disciplinary perspectives. The framework (Figure 1) proposes that behaviours are a function of material culture, practices, and norms, as well as additional factors beyond the control of the entity under examination (external influences). The integrative framework is influenced by system thinking, structuration and practice theory and considers the aspects that an actor might have agency over, and those which they do not.

Material culture, an anthropological term, relates to the 'physical evidence of culture'; objects, buildings and infrastructure. This includes the physical artefacts of a culture, for instance, the private vehicle. The term 'practice' is used in relation to an everyday meaning

¹ Changes to licensing rules, in particular increasing the licensing age to 16, has had an effect on these data.

of usual or customary actions. Norms are defined as the shared beliefs of how people should behave in a specific context; the expectations and aspirations about practices (what one should do) and material culture (what one has). External influences are the context within which an energy culture emerges and exists. As such, external influences can lock in patterns of behaviour, or promote new behaviours, thus acknowledging the system within which energy cultures and behaviours exist.

Figure 1. The Energy Cultures Framework. Source: Stephenson et al. (2010)



In this paper, the Energy Cultures Framework is adapted to examine mobility behaviours. This framework has been adapted to mobility research previously (Hopkins & Stephenson, 2014; 2016, Stephenson et al. 2014), and the concept has also been used to describe the specific material and immaterial, socially constructed aspects of mobility, which includes travel patterns, the built environment, and mobility-related discourses (Klinger et al. 2013; Haustein & Nielsen, 2016). The ‘mobility cultures’ approach is particularly useful in foregrounding (1) the physical and the symbolic dimensions of mobility practices, (2) the structures that operate to influence behaviour, and (3) the spatial and temporal specificities of particular practices.

Nevertheless, previous research on mobility cultures is largely quantitative (e.g. Haustein & Nielsen, 2016), and thus this paper speaks to the need for more in-depth and place-specific insights arising from qualitative methods.

2.2 Socio-Technical Transitions and the Multi-Level Perspective (MLP)

The replacement of one socio-technical regime with another is referred to as a socio-technical transition (Geels & Schot, 2007). The multilevel perspective has been proposed as one way to explore these transitions, and broadly distinguishes 3 heuristic levels; niche innovations, socio-technical regimes and socio-technical landscapes (Geels, 2004, 2005; Geels, 2012; Geels & Schot, 2007). The MLP is characterised by its co-evolutionary, systemic and actor-based approach. It emerged from innovation studies drawing from evolutionary economics, sociology of technology and neo-institutional theory (Geels, 2012), and provides a framework to explore stability and change; “the core analytical puzzle of transitions” (Geels, 2012: p.472). Critiques of the MLP include its emphasis on technological niches as the central drivers for regime change, neglecting downward pressures from the sociotechnical landscape (Berkhout, Smith, & Stirling, 2004). This led to the development of the MLP to better characterise the forces of change within this framework (For example: Geels & Schot, 2007). The empirical material presented in this paper provides evidence of landscape modifications contributing to regime change.

Automobility is a principal socio-technical institution (Böhm et al., 2006) and is distinguished by stability, lock-in and path dependency², three attributes emblematic of hegemonic systems (Geels, 2012). As an assemblage of political institutions and practices, business and social

² Lock in is understood as the self-perpetuating inertia of a historically-evolved system which demands great effort to change. Path dependence refers to “self-reinforcing processes that accelerate the development direction within a system” (Ulli-Ber, 2013: p.23).

organisations, ideological formation and phenomenology, automobility has become far greater than the automobile artefact alone (Böhm et al., 2006).

A summary of the analytical levels and examples of these levels related to generation Y mobilities is provided in Table 1. The features of change in this context are the heterogeneous mobilities of generation Y. Most MLP literature identifies radical changes as emerging from an identifiable source external to the current regime (such as technological innovations and social movements). However, in the case of generation Y, there is no clear explanation for why this trend is occurring in a selection of industrialised countries globally nor accounting for the variety of mobilities both supporting and rejecting automobility norms (Hopkins & Stephenson, 2016).

Table 1. Analytical Levels of the Multi-Level Perspective Related to Generation Y, Authors depiction and application, adapted from Geels (2012).

Analytical level	Brief description	Actors	Pace and direction of change	Examples of relation to generation Y
Socio-technical landscape	Wider context influencing niche and regime dynamics: urban design, political ideologies, societal values, beliefs, macro-economic trends etc.	Beyond the control of individual actors	Structured, slow change	Financial prioritisation, rising cost of home ownership, overseas travel norms, higher education
Socio-technical regimes	The “deep structural rules that coordinate and guide an actor’s perceptions and actions” (p. 473)	Actors are embedded in socio-technical regimes	Slower, stable trajectories	Automobility, multi-modality, sustainable mobility

Niches	'protected spaces' for innovation to occur	Niche actors work on radical innovations (differ from existing regime)	Can be rapid, random directions	Technologies (e.g. ICT and social networking), sharing innovations, low-carbon communities
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2.3 A 'Mobility Cultures' Approach to the MLP

This paper contributes to the literature on socio-technical transitions through an actor-centred approach to transitions-in-practice. This allows light to be shone on the complex interconnections of the material and the social in (re)inforcing particular mobile behaviours, which, in the case of this paper, differ from traditional car-dominated practices, but which are still encapsulated within the dominant mobility regime. The analytical levels of the MLP draw attention to the intersections of innovation and embedded structures in maintaining or revising these behaviours. The case study provides context-specific empirical insights to inform these analyses, and with evidence of the geographies of mobility transitions, which are enacted locally but influenced by pressures emerging from a range of spatial scales. The research participants are understood as actors performing mobilities within the bounded constraints of the socio-technical regime, but also actively challenging it. Thus this research examines the symbiotic interactions between (clusters of) actors creating and experiencing their environment, but also constrained by the hegemony of automobility.

3. MATERIALS & METHODS

The empirical material presented in this paper draws from a series of semi-structured, qualitative interviews with generation Y (born 1980 onwards) in New Zealand. Qualitative research methods provide useful tools to examine the complexities of travel behaviour (Clifton & Handy, 2001). Thus qualitative research can aid understandings of the contextual

factors, underlying motivations, as well as the 'hidden' norms, values, and attitudes that underpin travel habits and routines (Lucas, 2013). Together the researcher and the research participant actively examine how and why mobility practices exist, and came to be. This research is, therefore, highly-detailed, but also temporally and spatially contingent.

3.1 Research Approach

Interviews were conducted in urban (n=34) and rural (n=17) contexts across New Zealand between July and September 2014 (See Table 2), and were conducted by the author. Both drivers (n=13) and non-drivers (n=38) were recruited for this research. In this context, non-drivers were defined as participants without a driver's licence, currently learning to drive, or with a licence but who identified as a non-driver (i.e. no longer drives). Eight participants had a full or restricted driver's licence but chose not to drive. Thirteen non-drivers intended to learn to drive: 4 in the next month, 3 in the next 6 months, 3 in the next 12 months, 2 in the next 2-3 years, and one 'sometime in the future'. Three participants without a driver's licence had no intention to learn to drive. Fourteen participants were learning to drive at the time of the interview.

Participants were recruited using open advertisements, and individuals 'self-selected' to participate in the research. All participants were entered into a draw to win one of three supermarket vouchers, and prizes were awarded at the conclusion of the fieldwork phase. A semi-structured interviewing style was adopted with key interview themes including daily travel practices (e.g. commute to work/ study), learning to drive, perceptions of transport modes and users, social networking and online communications, and overseas travel. Participants were invited to tell stories and anecdotes about their mobility experiences, which

helped to build a picture of their material culture, mobility practices and underlying norms.

Interviews lasted between 18 and 71 minutes, with a mean duration of 38 minutes.

Table 2. Aggregated Data on Research Participants Across Three Geographical Contexts.

Location	Auckland (n=17)	Dunedin (n=17)	Rural NZ (n=17)	Average (n=51)
Gender (% female)	59	65	35	53
Age (average; range)	24; 18-34	25; 19-35	20; 18-31	23; 18-35
Occupation (%)	Student FT = 24 Student PT = 12 Employed FT = 40 Unemployed 24	Student FT = 18 Employed FT = 53 Employed PT = 24 Unemployed = 5	Student FT = 82 Student PT = 6 Employed FT = 12	Student FT = 41 Student PT = 4 Employed FT = 35 Employed PT = 10 Unemployed = 10
Highest education (%)	High school = 47 College = 6 Undergrad = 29 Postgrad = 18	High school = 29 Undergrad = 47 Postgrad = 24	High school = 82 Undergrad = 18	High school = 53 College = 4 Undergrad = 29 Postgrad = 14
Licensing status (%)	Full = 35 Restricted = 6 Learners = 24 None = 35	Full = 35 Learners = 35 None = 30	Full = 24 Restricted = 24 Learners = 24 None = 28	Full = 31 Restricted = 11 Learners = 27 None = 31
Parental status (%)	0	6	0	6

3.2 The Analytical Process

All files were fully transcribed and then uploaded to NVivo10 qualitative software to allow the researcher to explore the material and identify emergent patterns and themes. Using NVivo10, the author coded freely, co-constructing themes emerging through the qualitative material. From this process, it became clear that the Energy Cultures approach could elicit interesting insights of the research participant's material culture (what they have), norms

(what they think), and practices (what they do), alongside the external context (influences on behaviour beyond their control), which could, in turn, produce qualitative clusters of traditional and non-traditional mobility practices. A second round of coding thus adopted the Energy Cultures Framework (Stephenson et al., 2010) as an analytical tool, whereby the researcher systematically analysed the text documents for reference to the different material and immaterial features. After all 51 transcripts were coded, the nodes were explored for sub-themes and interconnection. This was coupled with the first round of analysis to highlight emergent qualitative clusters of mobility behaviours. This approach unpacks the underlying features of non-traditional mobilities, and in particular stresses the specific conditions that lead to the rejection of automobility in a specific place, and at a particular time.

The analytical process also examined similarities and differences between individual participants as well as 'driver' and 'non-driver' groups. This paper, focuses on mobility practices which differ from the auto-centric norm, but also includes participants who self-identified as drivers. Trends reproducing automobility were evident in this research, and have been published elsewhere (Hopkins & Stephenson, 2016).

4. RESULTS: What Examples of *Non-Traditional* Mobility Trends Are Evident?

Four overriding 'non-traditional' themes were identified through the analysis. These themes are not discrete, but overlap and interact. The argument brought forth here is that mobility practices that differ from automobility relate to a range of temporally and spatially contingent factors, and will be performed in different ways, for instance; not driving may be a temporary behaviour in order to save for a mortgage deposit, or may be more deeply rooted in norms of environmental concern. The four main themes are presented in the following sub-sections, supported by verbatim quotations.

4.1 Collaboration

Collaborative consumption has been recognised as a resource-saving action with access replacing ownership. New Zealand is yet to embrace formal car clubs and bike sharing schemes on the scale of the UK and the USA, however collaborative mobilities were depicted from the interviews (Table 3), whereby mobility needs were achieved through sharing practices (e.g. shared mobility) and sharing material culture (e.g. non-ownership). This was achieved through sharing vehicle ownership with parents, siblings and friends, and sharing commutes with friends and family:

I live out [of town] so me and my mum... we try and share a ride. So she'll drop me off in the Exchange and then she'll head along to the University" (Female, Dunedin).

Parental support was also articulated by many non-driver participants as a 'back up' when active or public modes were not available:

I'm pretty happy [with not driving]. Dunedin's not very big so it's not really that hard to get around. I don't really feel like I ever need for a car or anything but then quite often if I do need a ride for something my parents are, not all the time, but quite often they're happy to help me out. They're really, really helpful (Male, Dunedin).

Dematerialisation and collaborative consumption have been used to define generation Y's behaviours, arguing that young adults are less motivated by *having*, and more by *experiencing*. It is defined by a material culture of access and sharing including the utilisation of social networks to find shared transport.

Table 3. Collaborative Mobilities

COLLABORATION	Internal	External
Material Culture	Laptop, mobile phone, internet access, passport, foot wear and wet weather clothes, GPS or map	Home location, cost of housing, work location
(Mobility) Practices	Asking for a ride, hitch hiking, walking, borrowing/ sharing bikes, working temporary jobs, overseas travel, slow paced	Affordable overseas travel, availability of suitable work placements

Norms	lifestyle Dematerialisation, environmental concern, contentment, freedom through walking, asking for help
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These mobilities require negotiation and planning and therefore norms may include new interpretations of freedom and independence. Innovations including sharing apps, Uber, and social networking can be used to facilitate these mobilities, as research participants articulated using Facebook to coordinate and make travel plans. One participant, who used ride-sharing as a regular mobility practice, stressed the availability of spare seats and the ease at which he travelled without owning a vehicle, even when travelling within rural areas.

Look at how many cars there are on every highway and every street that have a spare seat. There's a spare seat in every single car... people laughed at me not having a car but I found absolutely no problem getting around because I basically just learned who commuted... every day, every week, every weekend or just talked to people and see who's going where... So just ride sharing, finding who's going where and going with them, which is really easy because there's always someone with a car going somewhere (Male, Dunedin).

Eagerness to 'dematerialise' was articulated, with material cultures rejecting ownership of active transport artefacts (e.g. bikes) as well as motorised artefacts (e.g. cars). This was often linked to transience, with most participants in rental accommodation or living with family, and frequently moving between homes in the same city, nationally or internationally. However, dematerialisation did not appear to be connected to GHG emissions or the CO₂ intensity of transport modes, but rather lifestyles and convenience and was often connected to a particular place and time, and may be motivated by finance. In this way, dematerialisation was articulated as closely connected to a desire for overseas travel and for freedom from the constraints of ownership.

4.2 Environmental Concern

Unsurprisingly, this research suggests that aspirations for low-carbon mobility and to reduce the local environmental impacts of transport modality (e.g. air pollution), contributes to a material culture that prioritises active and public transport modes over private motorised modes. This results in mobility practices that may be considered in light of available options, and their relative carbon intensity (Table 4).

“It takes so much energy to move a car somewhere and it just seems excessive. I think cycling and walking is exactly what I need. It gives me what I need and as much energy as I need to get to a place. Definitely that is something I think about all the time, ‘how many carbon emissions will my travel incur?’” (Female, Rural).

Table 4. Mobilities of Environmental Concern

ENVIRONMENTAL CONCERN	Internal	External
Material Culture	Active transport modes (walking and cycling) where possible, coupled with public modes. Avoidance of taxis and sole occupancy vehicles	Financial ability to make low-carbon options, temporal constraints and availability of low-carbon options.
(Mobility) Practices	Selecting low-carbon modes where possible, adopting travel substitution behaviours	Infrastructural availability
Norms	Environmental concerns, awareness carbon footprint, carbon budgets, connectedness to natural environment	Growing awareness of and concern for global climate change, climate education

For some participants, the ability to use low-carbon vehicles such as electric and hybrid vehicles could alleviate environmental concerns. This was articulated by a rural participant, who identified his need for a private vehicle, but suggested that different fuels could reduce associated carbon emissions, and make it a more sustainable transport option:

You can see how people would have cars... But yeah I think maybe something like a car, maybe electric, something where it wasn't emitting [carbon] as badly as other things or it's more sustainable (Male, Rural).

However, there is evidence of significant heterogeneity within this theme relating to aspirations for private transport and the performance of mobility. The capacity to make modal choice decisions related to the carbon intensity of the mode, requires knowledge,

commitment and a capacity to view speed and freedom from a new perspective. Locally, mobility behaviours paralleled with general non-drivers, where home location and proximity to key locations were particularly important. Nevertheless, the use of 'car substitutes' such as taxis were perceived to be less acceptable for environmentally concerned non-driver than for others.

They're really expensive; they're usually not very good service. They don't really solve any problems in terms of transport; in fact, there are probably too many taxis (Male, Auckland).

Moreover, environmental concerns were frequently coupled with other concerns such as the cost of parking and perceived stressfulness of driving. This again highlights the heterogeneity of travel behaviours, and consequently, the complexity of efforts to change behaviour.

I don't like polluting and you know I don't want to have to pay for parking in the city. I prefer to use this more sustainable mode of transport if I can (Male, Auckland).

Well apart from the fact that driving is stressful and environmentally unfriendly, um...there's just no need for all those people to be driving themselves, one person per car to work every day (Female, Dunedin).

4.3 Financial Constraint

In this theme, norms of financial prioritisation dictated both material culture and mobility practices (Table 5). Likewise, the non-inclusion of a private vehicle in material culture contributes to practices that are active and/or multi-modal. A changing socio-technical landscape, including the impacts of the global financial crisis, prioritisation of overseas travel experiences, and increasing costs of higher education, contribute to a new external context in which mobility cultures are situated. Therefore, learning to drive and car ownership are forced to compete with other financial priorities.

I was running a bit low on money and just the costs like warrant [of fitness], rego [vehicle registration], petrol, it all adds up and at the end of the year I'll probably have like less money than what I started with but I didn't want that to happen. I'd rather stay at about the same amount right through the year and not have to worry about a car that I have to spend money on (Male, Rural).

From the empirical material, there was evidence of participants prioritising education, travel and home ownership over car ownership, and using non-driving as way to reduce expenditures. This was also linked by some participants to the volatility of petrol prices and subsequent difficulty to budget. However, it should be stressed that these practices were often for a temporally fixed period, and the likelihood of forming new mobility habits during this time is unclear from this research, and is likely to hinge on the perceived ease or difficulty of continuing without a vehicle in the long term.

Some of the reason I sold the car is because it meant that I could then afford to buy a house so that's something I couldn't have afforded with a car. Just even wiping out insurance and things like that from the car means I've got a lot more money than, well more than my friends with cars (Male, Dunedin).

My car was a very old Honda and basically just stopped getting a warrant, couldn't get a warrant so I took it, sold it for scrap and then decided not to use my savings on getting a new car because I'm trying to save. Interviewer: "What are you trying to save for?" Participant: "Travel... I figured let's try living without a car because it does take up a lot of money, and yeah it's been going fine and I'm saving more (Female, Dunedin).

Table 5. Mobilities of Financial Constraint

FINANCIAL CONSTRAINT	Internal	External
Material Culture	Active modes prioritised, followed by shared options. Public modes used if necessary	Cost of housing, proximity from home to work, built environment, cost of public transport modes (relative costs)
(Mobility) Practices	Living close to key locations, prioritising budgetary constraints	
Norms	Financial prioritisation, desires home ownership, overseas travel, freedom from high travel and transport costs, prioritisation of alternative financial goals	Global financial crisis, rates of overseas travel, globalisation, cost of education

Shifting financial priorities could provide evidence of new norms affected by the changing socio-technical and economic landscape, which could destabilise automobility. Moreover, participants spoke of friends and family member's frustration at the costs associated with private vehicle ownership, and identified the range of expenses that include fuel and maintenance:

I mean lots of my friends don't have cars and the ones that do like their cars just cost them a lot of money... so no-one I know is really very positive about driving... because it's just like a big pain in the arse really (Female, Dunedin).

Everyone at work is whingeing about their WOFs are due, and registration, and fuel going up. I pass the fuel station every day and I see it go up and down. When it goes up considerably, I know there's going to be a lot of whingeing that night. It just doesn't affect me (Male, Rural).

4.4 Urban Mobilities

Specific urban mobilities were evident from the empirical material (Table 6) and characterised by low rates of home ownership coupled with relatively high access to and uptake of active or public transport modes. This is interwoven with the broader multi-modal mobilities, however it is highly specific to urbanised areas due to proximity between locations, public transport provision and high land prices. Thus the material culture of this group is electronic in nature; ICT and social networking were articulated as key mobility. Due to apartment/ city centre living often with little storage facility, physical artefact ownership was not prioritised. Instead, proximity to public transport hubs was articulated as a key mobility aspiration.

Because I've never owned a car of my own, it's always been really important to me to live near public transport links (Female, Auckland).

Many of these behaviours were highlighted as 'purposeful', intended actions that allow the individual to negotiate the urban space, and the constraints of the transport infrastructure:

I purposely found a house close to work and close to a bus stop. So I walk 300m, I know because I have a GPS on my phone that tells me how many steps I've taken every day,

which is fantastic. Its 300m to a bus stop, and the bus is 10 minutes from my house (Female, Auckland).

Expectations of efficient public transport connectivity and wide spread, high speed internet connections were discussed by participants, and adopted to allow participate in social activities across the city.

We [participant’s social group] can’t live without the Internet. We also can’t live without not being in central Auckland and not being able to access the cafes and places that we can meet up. So all of my friends are in central Auckland or thereabouts, they’re all on major bus routes. None of them actually has got a car or is using a car on a regular basis. So we all get around with public transport (Female, Auckland).

Table 6. Urban Mobilities

URBAN MOBILITIES	Internal	External
Material Culture	Bus pass, bike, walking shoes & rain coat, smart phone, tablet, Internet, Live close to CBD/ transport links, renting homes or living with parents	Cost of material goods, rental prices, mortgage rates and first time mortgages
(Mobility) Practices	Using public and active transport modes, reliance on Internet, Online communications, meeting near transport hubs	Provision of active transport infrastructure (pavements and cycle lanes) and public transport routes, parking facilities, WIFI Internet coverage, cost of airfares
Norms	Proximity prioritised, aspire for easy mobile connectivity, congestion and parking costs discourage car ownership	Land prices, urbanisation

Nevertheless, existing as a non-driver in a car-dominated system was described as a “different lifestyle” that may require sacrifices in order to achieve mobility needs. To live without a private vehicle, or without the core competency to drive, makes living on a public transport route a priority and therefore restricts home locations, particularly where the public transport network is not well connected, and this is further perpetuated by escalating house prices:

It’s a different lifestyle. You have to choose. There are sacrifices you have to make. You have to choose, particularly if you don’t want to make huge mobility sacrifices, you

have to live in an area where there's good alternative transport mode access" (Male, Auckland).

4.5 Summary

In sum, four themes depicting non-traditional mobilities arising from the qualitative interviews with generation Y have provided evidence of how heterogeneous “non-driver” practices negotiate a car-dominated mobility system, and the motivations for rejecting the hegemonic mode. There is evidence of the socio-cultural reorganisation of social life, and mobility needs are met through norms and practices that adopt a range of modes. Despite the status of the car in the current transport system, non-driver participants in this research spoke positively of their mobility experiences, often highlighting their capacity to overcome the barriers and adversity put in place by not driving in a system designed for private car based travel. Nevertheless, it is important to note that these mobilities are bounded in a particular time and space, and therefore may not be fixed or long-term, but rather fluid practices that suit current geographic, economic, social circumstances of their life-stage.

5. DISCUSSION

5.1 What Insights can the MLP Provide to Understand the Destabilising Characteristics of Emergent Mobility Trends?

As noted earlier in this paper, the MLP proposes three levels through which to explore stability and change. *Niches* have been promoted as a ‘*source of path-breaking innovations*’ (Smith & Raven, 2012), providing protective space for the development of innovations. The empirical material suggests that technological developments in information communication technologies, coupled with systems of shared ownership provide opportunities for user/actors to shift practices away from car ownership and private car travel. While car clubs

and bike sharing initiatives are not as prevalent in New Zealand as in other countries, the interviews provided examples of informal sharing which could move towards “re-imag(in)ing the car as a shared commodity” (Dowling & Simpson, 2013: p.422).

Geels (2012) argues that cultural preference for private ownership stabilises the existing auto-dominance, yet evidence from younger generations has indicated changing preferences towards dematerialisation and increased willingness to share (Gaskins, 2010; John, 2013). Though the qualitative evidence presented in this paper is not generalizable to all young New Zealanders, it could be suggested that a willingness to share was present, and further research into these norms and aspirations is needed, particularly as this could provide a window of opportunity for niche development beyond piecemeal initiatives (Parkhurst, Kemp, Dijk, & Sherwin, 2012).

It has been argued that a shift is taking place across the global North towards an economy of experiences (Sundbo & Sørensen, 2013) or economy of sharing (John, 2013), rather than an economy of things. Dematerialisation is a key aspect of sharing and is expressed through three areas; digitalisation, eco-efficiency and intangibility (Boswijk, 2013). The evidence suggests that norms of dematerialisation could intertwine with preferences for overseas travel, further education, and financial insecurities associated with the growth of precarious labour and the post-global financial crisis (GFC) landscape. The sharing of automobiles has been identified as a particularly valuable new opportunity in order to overcome barriers to, and burdens of, ownership (Gaskins, 2010), but the successful introduction of car clubs to New Zealand is still yet to materialise.

The role of ICT as a travel substitutional innovation is contested (Sheller & Urry, 2006), and was not evident within this sample. This is not to suggest that ICT was not important to the

participants – on the contrary – internet access and the use of real time travel information and GPS functions was of critical importance to the performance of mobility. This use of innovative technologies could be a source of destabilisation for the current regime, particularly in urban environments. Mobile technologies and ICT appear to allow for more flexible lifestyles, something which is at the core of generation Y's mobility requirements (Benckendorff et al., 2010). Moreover, social networking facilitated the informal (ride) sharing of the research participants, and could therefore be a conduit to more sustainable mobility practices.

Emerging mobility preferences that diverge from a car-centred tradition may impact upon the stability of automobility (Geels, 2012). This is evident through values such as perceptions of freedom and autonomy, which were previously associated with car ownership and licensing (Böhm et al., 2006). Freedom has long been associated with the ability to be mobile at will (Sager, 2006), rather than being dictated to by the schedule of public transport, family and friends or the time associated with active transport. Yet saturated infrastructure, leading to congestion and the lengthening of travel times, has contributed to the rejection of automobility and thus may act to destabilise its hegemonic status. For example, one participant noted that:

“I’m just kind of sick of cars in general, even though I had quite a nice car, it’s just that the idea of driving... I think driving a car is like a broken promise to a car advertisement that you know, ‘it’s going to be super sweet and easy’ and instead all you’re doing is paying lots of money to sit in traffic and get really annoyed” (Male, Urban).

Moreover, contemporary perceptions of auto-freedom, could also extend to include freedom from the cycle of car ownership costs (e.g. servicing, maintenance, vehicle safety testing) and the volatility of petrol pricing. This can contribute to new mobility practices that seek alternative modes in order to account for these costs. The research provides evidence of

competing financial priorities; home ownership, overseas travel, and higher education, to which some young people respond by adopting low-cost travel patterns.

The interviews provided some evidence of environmental awareness challenging automobility norms through downward pressure to transition to low-carbon technologies (e.g. EVs, biofuels, increased efficiency of internal combustion engine vehicles), and low-carbon modes (e.g. active and public transport). Nevertheless, it is important to note that low-carbon technologies are unlikely to address the social and equity issues of automobility, due to the perpetuation of private vehicle ownership. Coupled with new ownership models and increased prioritisation of active and public modes, however, might destabilise the automobility regime and contribute to a socio-technical transition to a sustainable mobility regime.

6. CONCLUSIONS & IMPLICATIONS

The need to envision a new transport paradigm has arisen from concerns about the environmentally and socio-economically unjust nature of automobility. The practice of automobility is enforced by a system prioritising car use. Yet a trends in generation Y mobilities (e.g. collaborative, dematerialised, financially constrained, environmentally concerned, urban) appear to be making decisions which remove them from the cycle of automobility; decisions that could relate to their material culture, norms and practices. Nevertheless, these decisions are entrenched within the external context, and dominant socio-technical regime of automobility. Thus they appear to provide heterogeneous examples of resistance to hegemonic practices of car-dependence. By better understanding how and why these decisions have been made, there may be opportunities to leverage from generation Y to gain greater traction for a post-automobility regime.

Socio-technical transitions literature can assist understandings of generation Y mobility trends by identifying the potential areas of opportunity, exploring the drivers of change, and developing knowledge of the interconnections between the three levels of the MLP. Nevertheless, if changes to particular generation Y mobilities are going to continue in the long term, and contribute to a sociotechnical transition, it will require support from powerful actors (Geels, 2012), policy and infrastructure developments and acknowledgment of alternatives to business-as-usual road building agendas. A starting point could be through visioning a new (sustainable) paradigm of mobility. Banister (2008) argues that public acceptance of a new mobility paradigm drives political acceptance of a need for change, and therefore bottom-up and middle-out agents of change may be instrumental in supporting a socio-technical regime change. Since socio-technical regimes are embedded in pockets of inertia and vested interests, there will be a reluctance to deviate from the current dominant regime and road building agenda. Yet generation Y mobilities, along with supporting niche innovations and the socio-technical landscape, could represent agent of change.

More theoretically grounded empirical insights are required into the drivers and agents of generation Y's mobility trends to better understand if these trends signify broader social change and whether they might result in a broader mobility transition. Nevertheless, as Banister (2008: p.77) has argued: "to many people, sustainable mobility requires a radical change in the way in which travel decisions are made. Naturally, people feel nervous about it, and they are reluctant to alter their behaviour..." This could be achieved by facilitating and enabling the transitions which are already occurring in trends of generation Y's mobilities. While it is still a small proportion of the population making changes, the normalisation of public and active transport use, along with upgraded infrastructure and facilities could result in a change to the mobilities landscape, providing new cultures of mobility transcending

generational boundaries. In terms of governance, policy and regulation, developed and emerging economies could benefit from countries displaying leadership, and moving towards a new model of mobility management.

There are access issues related to mobility regimes, including automobility and a sustainable mobility regime. One example is the technical requirements or 'competencies' (Shove, Pantzar, & Watson, 2012) for driving which have been designed to legitimise and regulate driving (Oatman-Stanford, 2014), simultaneously exclude particular communities including lower socio-economic groups, youth, many people with disabilities and the frail elderly (Martin, 2009). However, public and active transport modes might also be inappropriate for the needs of particular communities. Equity in terms of transport provisions requires attention to specific needs, and the capacity of public and/or private organisations to provide a range of mobility services.

The spatial dimensions of MLP has received less academic attention (Geels, 2012), and there are complex spatial orientations of transportation systems. For example, aspects of the automobility regime are at once local, regional, national and international. The spatial characteristics of generation Y mobility are also not clearly understood. Whether the changes are occurring in low density regions as well as high density urban areas requires investigation. For example, how would a transition from automobility operate in regions with limited public transport provisions? Moreover, a historical perspective drawing from learnings of past transitions, may illuminate additional insights.

It is important to highlight that this paper is examining automobility, however overall mobilities need to be better understood to better explore this phenomenon. In other words, while generation Y's automobility may be decreasing, their overall mobility (using alternative

modes including the aeroplane) might still be increasing. Furthermore, the generation Y mobility trends in developing countries require exploration. Despite the dominant system, some generation Y mobility cultures have managed to challenge automobility through non-participation. This could indicate a role for social clusters in changing the transport system. The MLP illuminates the range of actors, agents and governance structures which enforce the automobility regime and thereby influence any transition towards a more sustainable regime. The variety of drivers of change might provide resilience for new regimes and allow long-term, broad-scale change. The heterogeneity of generation Y mobility cultures could indicate steps towards a new mobility regime; demanding a range of mobility options, including, but not limited to private vehicles, to provide a sustainable and equitable mobility system.

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