



The Workshop

Talking about transport modality shift: A literature review

Dr Rebecca Gray

A review by The Workshop to inform development of a communications guide for the Waka Kotahi NZ Transport Agency

Suggested citation: The Workshop & Gray, R. (2020). *Talking about transport modality shift: a literature review*. Wellington: The Workshop.

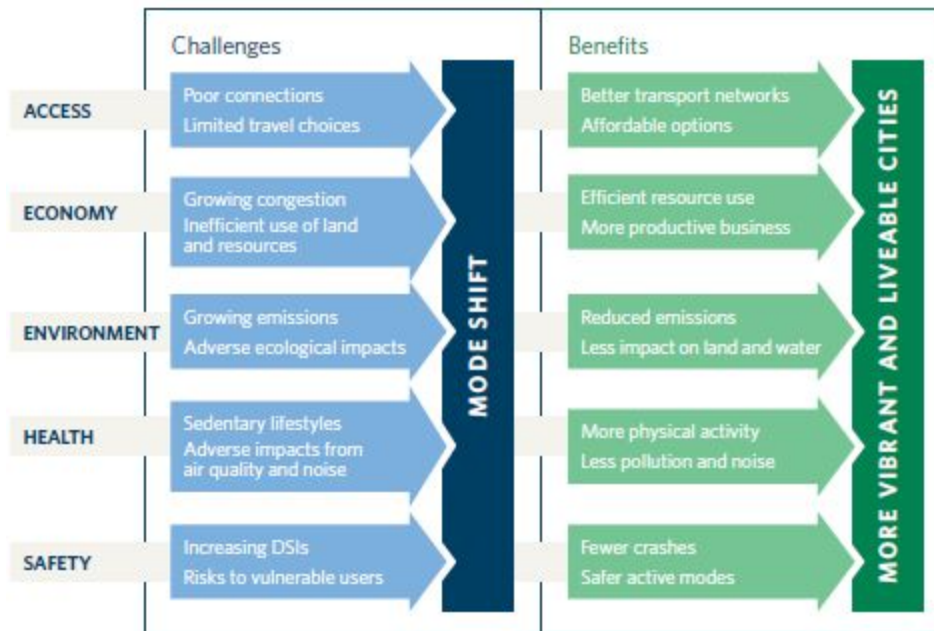
Contents

Talking about transport modality shift: A literature review	1
Introduction	4
Summary of review recommendations	6
Research question	8
Search strategy	9
Contents of this review	10
Dominant discourses and understandings, their relationship to mobility options and frames that may shift them	11
Automobility and individualistic ideology	11
Individual/consumer choice framing of sustainability and active transport promotion	12
Personal values and transport options	13
Unacknowledged political aspects of transport planning	14
Shift from car-centric defaults	15
Countering dominant discourses: recommendations	17
Engagement approaches	19
Techniques for discussing visions for future transport options	19
Approaches to collaborative stakeholder engagement and associated communications	19
Framing visions for transport mode shift	23
Discussing visions for change: recommendations	23
Experimentation and prototyping	24
Approaches to be wary of	25
Didactic messaging	25
Frames to avoid: cost/savings	25
Frames to avoid: “smart“	26
Avoiding unhelpful frames: recommendations	26
Accessibility planning and equity	27
Discussing planning and equity: recommendations	28
Bibliography	28

Introduction

Cities worldwide are being urged to promote healthier urban design “to actively pursue compact and mixed-use urban designs that encourage a transport modal shift away from private motor vehicles towards walking, cycling, and public transport” (Sallis et al., 2016). This change is known as “mode shift”. Waka Kotahi NZ Transport Agency (the Transport Agency) aim to increase the share of travel in New Zealand cities by public transport, walking and cycling, meaning less reliance on private motor vehicles. Given the unsustainable nature of car-reliant travel in cities and the competition for space, this mode shift has potential to deliver wide-ranging benefits (Waka Kotahi NZ Transport Agency, 2019):

Figure 4 - A benefits framework for mode shift



Source: Waka Kotahi NZ Transport Agency (2019).

Waka Kotahi NZ Transport Agency will be working on material for local councils to assist with engaging communities in public conversations about urban mobility and mode shift in transport planning. Local authorities play a large role in developing urban transport policy and in engaging with community advocates and stakeholders about mobility options. However, both advocates and council staffers have noted that barriers to incorporating community advocates’ concerns into planning include “funding, long lead-in times for roading projects, political will-power, latent demand, staff capacity, road building culture” (Richards et al., 2010). The Transport Agency has commissioned The Workshop to develop a research guide outlining the most effective communication approaches for engaging on these issues using an evidence-based approach.

This review looks at evidence about discourse, communication strategies and development of future visions for transport modal shifts in cities around the world. It focuses on work that aligns with The Workshop's theoretically driven, evidence-led framework of communications with an emphasis on framing techniques.

Summary of review recommendations

1) Focusing on your audience

- Listen where appropriate and focus on vision making in these exercises. Be careful about consulting on issues where the public cannot usefully contribute or where they are only being asked for superficial feedback. Community co-design is important, but a perception of over-consulting without listening will not help. Starting with bigger picture visions for community needs and priorities may be most helpful for usable urban design.
- Provide social proof of systems change. Take advantage of temporary changes to road use to enable demonstrations of different mobility patterns and to promote messages about different approaches being **possible**. Show stories from urban residents who can describe benefits they have experienced from taking opportunities to shift transport mode.
- Be wary of framing mobility policy options based on consumer demand. This can focus thinking on what those people who can pay are willing to pay rather than **what people need** (and in some cases, may not be currently able to afford).

2) Having a concrete meaningful vision for a better world

- Start with the better world. Work into how to get there later. Keep drawing attention to **bigger-picture aims and aspirations** for urban environments. Getting caught up in contentious debates about operational detail is a constant issue in this space. Start with big visions and move in more gradually, so smaller-scale detail is only discussed in the context of the big shifts.
- Lift people's gaze to systems and structures. Avoid making transport changes about personal choice or responsibility for behaviour change. **Emphasise infrastructure** to make the city itself more eco-friendly and easier to navigate without needing a car.
- Be wary of letting excitement over new technology become distracting or exclusionary. Technological solutions to mobility issues are interesting and potentially useful but should be introduced as part of an **overall strategy** to make transport options more sustainable and equitable.

3) Making it matter to your audience in ways that motivate (using intrinsic values to connect)

- Lead with intrinsic values. Emphasise **fairness** across generations and places in decision making. This means not burdening future generations with poor infrastructure and climate change effects and not neglecting less wealthy or vocal population groups when improving mobility options.

- Avoid extrinsic values. Do not over-emphasise economic considerations. Another default for policy discourse, looking at cost-benefit framing will push people into thinking about what is being spent on alternative transport systems rather than seeing these systems as an overall **investment in urban experience improvement**.
- Ideas about **freedom and independence**, although often associated with car use, can also apply to public transport use and could form useful messages for modality shift. That said, the transport system would have to be run well enough that people genuinely did feel it enabled freedom and independence.

4) Providing better explanations

- Acknowledge the reasons behind current defaults. It is easy for people to feel resistant to changes but making them aware of the political and industry influences that have set current systems in place may be helpful to open minds to the possibility that these **defaults do not need to be the future**.
- Sell the cake, not the ingredients. Focus on what people want to achieve from driving, then look at how other systems can meet those aspirations. Communicate about the **experience** that can be achieved rather than the technical details.
- Don't lead with the problems caused by car dependence (or the implication that people who drive are at fault). Explain the better world and the **benefits** of putting transport modal shifts in place.

Research question

In line with the brief and The Workshop's theory of strategic communication, the broad question for the review was:

When communicating urban modality shift and encouraging a less car-centric planning approach, what strategic framing and communication strategies are effective for helping people think productively and in line with expert understandings and gaining constructive engagement?

More specifically, we were interested in what framing strategies help people understand:

- the need for policy makers to move away from car-centric planning
- why urban design and transport policies need to focus on equity and environmental protection as outcomes
- that transport mode shift to public and active transport can work to support these goals.

Search strategy

The review was to find evidence on effective ways to talk about transport change in the context of planning for a mode shift. From an initial list of keywords relating to the topic¹ and keywords relating to The Workshop's approach,² we narrowed down a set of search term combinations as shown in Table 1 and searched abstracts of the identified documents for mention of engagement, messaging and discourse before downloading for further review. Searches were carried out using three databases (PubMed, Scopus and Google Scholar) with search combinations discontinued after three consecutive pages with no relevant results.

Table 1 Search terms and number of results saved from each

	AND					
TOPIC	future/ s	framing /frames	messaging	values	communication (adding "strategy")	decision-making/ decision
Urban mobility	10	23	2	8	5	11
Active transport/travel	7	30	0	0	2	16
Modality/mode shift	0	0	0	2	0	0

When reviewing the documents, particular attention was paid to the following ideas based on the empirical framework of strategic communications The Workshop utilises:

Findings about mental models (identifying them as enablers or barriers to change), use of frames and values-based messages, use of explanatory metaphors and communication devices.

Some literature refers more to participation or engagement about policy change rather than direct strategic framing or communications on the issues. In these cases, bearing in mind The Workshop's evidence base around values messaging, we looked for examples of:

- appeals to intrinsic values,
- universalist, that is, human rights framing of transport mode issues

¹ Urban mobility, active travel, active transport, sustainable transport, walking, modality shift, bicycling, cycling, healthy transport, public health.

² Visioning/visions, futures, myth busting, debunking, framing OR frames, reframing, values, intrinsic values, priming, messaging/message, metaphor, language, cultural models, cultural narratives, simplifying models, causal chains, explanatory chains, narratives, messengers (also discuss trust, sources etc.), communication science/communicating/communications, reasoning, decision making OR decision-making, public policy.

- communications that encompass vision making and are solution-led rather than problem-led
- and when articles discuss examples of successful change processes, do they identify evidence for what framing and messaging approaches worked?

In addition to the documents identified in this search, reports from The Workshop and other agencies working on strategic framing have been referred to where findings could be applied to the issues raised from the literature about transport mode shift.

Contents of this review

In the literature that we identified in searches, there is little that directly addresses the research question. Unlike broader topics such as climate change, there does not appear to be a research sub-genre dedicated to strategic communication techniques about the issue.

What we were able to do in this review was to identify literature about dominant discourses that influence current mobility systems and about engagement, participation and action on transport modality shifts. We then scanned the relevant works for their references to communication approaches.

In some cases, these studies do not cover what communication strategies worked. However, there are examples discussed of issues that have been inadequately addressed and that should be taken into account for future advocacy and policy change work. These findings are discussed with reference to the findings about communication strategies from The Workshop's previous evidence reviews on overlapping topics.

The review findings cover:

- existing dominant discourses and understandings and frames that may shift them
- engagement approaches
- equity and access considerations for transport mode shift planning and communications.

Each section is accompanied by a set of recommendations drawn from other research about messaging approaches that have potential to mitigate the issues raised.

Dominant discourses and understandings, their relationship to mobility options and frames that may shift them

Automobility and individualistic ideology

Many of the studies found for this review refer to the influence of dominant values and discourses about transport systems. The current default reliance on private automobile transport tends to be related to neoliberal/individualistic/capitalist ideology (where this means market-driven solutions, individual choice with minimal government intervention and a focus on economic growth). This framing of transport policies, which may have initially led to a focus on individuals maximising their freedom by driving their own vehicles, has continued to dominate new forms of transport planning, including those focused on sustainability. In New Zealand, it is argued that transport policy has been framed as a driver for economic growth, which has then led to a prioritisation of a narrow range of transport solutions (Smith, 2016).

Particularly in the USA and other western countries, car use can be tied to individual rights and freedom (Kurniawan, Ong & Cheah, 2018; Doughty & Murray, 2016). In some areas, automobility preferences relate to conservative values such as wariness of those from other racial groups, feeling responsible for the safety and security of individual family units and an associated desire to move from urban environs into suburbs (Henderson, 2009).

Like New Zealand, Italy has a high rate of car ownership and its mobility system currently seems locked in to reliance on cars. This reliance is linked to industry dominance, infrastructure and use preference, although it seems fair to surmise that these factors are all influenced by each other. A study on future transition possibilities found that big changes to the existing regime tended to be politically unpalatable because of the greater expense and uncertain results from implementing them. Shorter-term tweaks to the existing system that were still compatible with car reliance (for example, electric mobility) were more likely:

Due to the price of innovation and long development lifetimes, technological niches have a lower chance of being nurtured as a regime in the near future, which is why many decision makers focused on managerial innovations that seem more probable as they need less financial resources. (Moradi & Vagnoni, 2018)

Similar issues have been found in Sweden, where local governments have identified transport modal shift as a key environmental priority but struggle to make the changes required to reduce car dependency (Fenton & Gustafsson, 2015).

Individual/consumer choice framing of sustainability and active transport promotion

Analysis on framing of sustainable mobility and active transport initiatives in France showed that there are plenty of examples of academics criticising the individual responsibility framing of sustainability messages:

... the paradigms, instruments and communication of policies in favour of safe, sustainable mobility are strongly influenced by a rationality that defines individual behaviours as the key to solving public problems ... While this framing could be questioned, urban travel and transport policies in favour of sustainable mobility are amazingly sheltered from controversies and public debates. The morality and noble causes invoked certainly have something to do with this. (Reigner & Brenac, 2019)

Similarly in Belgium, researchers note that the two dominant framings of mobility planning – neoclassical (economy-driven) and sustainable – both turn out to be part of the same political orthodoxy, which “atomize structural causes for mobility-related problems ... [and] further encourages a belief that the transition towards a sustainable society is attainable primarily via behavioural means” (Kębłowski & Bassens, 2018). The messages with frames the authors identified as neoclassical, sustainable or critical are copied below.

Table 1. Transport policy agendas in Brussels.

Approaches to transport	Orthodox agenda		
	Neoclassical	Sustainable	Critical
Problems	<ul style="list-style-type: none"> • “Too many traffic jams”: traffic congestion due to insufficient road and parking infrastructure. 	<ul style="list-style-type: none"> • “Too many cars”: car-based mobility leading to diminished quality of PT service and urban environment 	<ul style="list-style-type: none"> • “Too much inequality”: car-based mobility as contributor to socio-economic and spatial inequalities as well as to continuous urban sprawl and impoverishment of the BCR
Visions	<ul style="list-style-type: none"> • Transport: a rational, expert-led discipline. • Transport: a motor of economic growth. • Transport: a place-based asset for urban attractiveness and competitiveness. 	<ul style="list-style-type: none"> • Transport: a component of sustainable, attractive, and liveable city. 	<ul style="list-style-type: none"> • Transport: a common good rather than a market commodity. • Transport: an inherently political issue.
Solutions	<ul style="list-style-type: none"> • Development of the underground metro as the most efficient and profitable public transport mode. • Development of car infrastructure. • Entrepreneurial financial solutions (e.g. PPPs). 	<ul style="list-style-type: none"> • A plethora of technological and behavioural solutions: from underground metro development to “mobility coaching” and urban drones. 	<ul style="list-style-type: none"> • Development of dense surface tram network. • Substantial reduction of car infrastructure. • Urban toll leading to reduction or abolition of PT fares.

Source: Kębłowski and Bassens (2018).

Individual-choice framing means that collective solutions are not prioritised, nor are social determinants of access to different transport options adequately considered. When transport decisions are seen as individual responsibilities, sustainable transport use is framed through moralistic ideas, making it harder to move the conversation towards social justice and access (Doughty & Murray, 2016).

Some of these contradictions can be found with regard to urban cycling:

... whilst enabling some to enact a new 'moral' citizenship, it simultaneously underlines the marginal citizenship of less mobile Londoners. (Green, Steinbach & Datta, 2012).

It is thus important to consider the possible unintended consequences – particularly invoking in-group/out-group values – of promoting cycling or other active transport behaviours as related to personal identity or virtue. Similarly, “sustainable” can be taken as a shorthand for “morally sound”, which may also lead to unhelpful rationalisations.

Personal values and transport options

While promotions of active transport can rely on individual choice (and responsibility) ideas, the reality of people's transport choices tends to be more grounded in their needs and their perceptions of feasible alternatives (Doughty & Murray, 2016). Values do not necessarily predict use of more sustainable transport options. European research found that people from Nordic countries, who identify with more post-materialistic values and high environmental awareness, were not always as concerned about the polluting aspect of traffic, mainly because they were less immediately affected by it than those in more densely populated areas (de las Heras-Rosas & Herrera, 2019).

Car users have been found to prioritise efficiency and flexibility values, whereas people's priorities for safety and comfort can link to a preference for active transport (Nordfjærn et al., 2014). There are indications that certain aspects of sustainable or active mobility are an easier sell to a larger share of the population. For example, an exercise testing pairs of messages about drawbacks of driving and benefits of walking, cycling, carpooling, electric vehicle and public transport found that, among all but the most dedicated audience segments, benefits of cycling or public transport messages did not perform well, whereas messages about benefits of walking were consistently appealing (Forbes et al., 2014).

As shown in the diagram copied below, preferences for travel mode are influenced by interacting external and internal factors. These authors have therefore found, while examining public expectations of future urban mobility in Singapore, that structural and psychological interventions can work together to influence modal shift preferences.

The presence of structural interventions could help induce psychological interventions. For instance, when infrastructures supporting active mobility are available—making this mode of mobility weather resistant, more accessible, comfortable, convenient, and safe for commuters—commuters are more likely to find active mobility a more compelling option than using other transport modes (e.g., private car). (Kurniawan, Ong & Cheah, 2018)

The implication for communications here is that the most engagement could be gained from concentrating on the benefits of alternative transport modes while ensuring that infrastructure can live up to its promises.

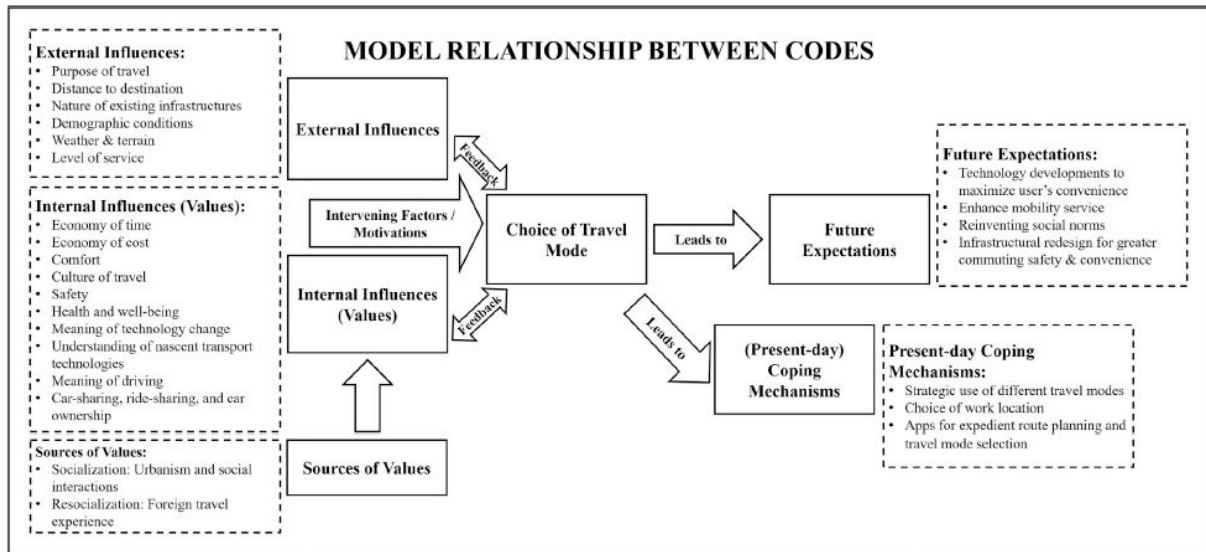


Fig. 1. Interaction of various influences affecting the urban mobility system.

Source: Kurniawan, Ong and Cheah (2018).

Unacknowledged political aspects of transport planning

Researchers have noted concerns that proposed policy changes to enable better urban mobility risk focusing too much on technological and behavioural fixes, without bringing a political lens to transport issues. This, it is argued, means that initiatives to enhance urban quality of life and mobility can lead to systems that cater to social classes who are already highly mobile and disregard social costs to others (including gentrification and uneven access to services) (Kębłowski, Bassens & Van Crieckingen, 2016).

A critical analysis of citizen engagement promotions regarding pedestrianised streets in Brussels found that engagement involved marketing slogans and officially open consultation in which only superficial design elements could be discussed. The authors perceived that the consultation downplayed the involvement of existing citizen organisations and uncoupled the relationship of mobility to other planning issues such as housing development. However, citizen organisations mobilised against this strategy, aiming to bring back awareness of political elements of mobility issues (Kębłowski & Bassens, 2018).

At the very least, it seems necessary to recognise that any urban planning process involves power relationships and conflicting interests. In some cases of car-reduced planning initiatives, representatives of the private housing industry are the players opposing planners' efforts to shift the focus towards alternative mobility options (Selzer & Lanzendorf, 2019).

Reframing transport planning as political was found to be the common denominator in successful urban transport policy change in Sweden:

To summarize, politicization of urban transport is a key component in understanding policy change in this case. The road to sustainability involved decisions and manoeuvring by individual politicians, including the formation of an administration in line with political ambitions, made acceptable through the discursive impact of sustainability, and all in all, framing urban transport as a political issue. (Hysing, 2009)

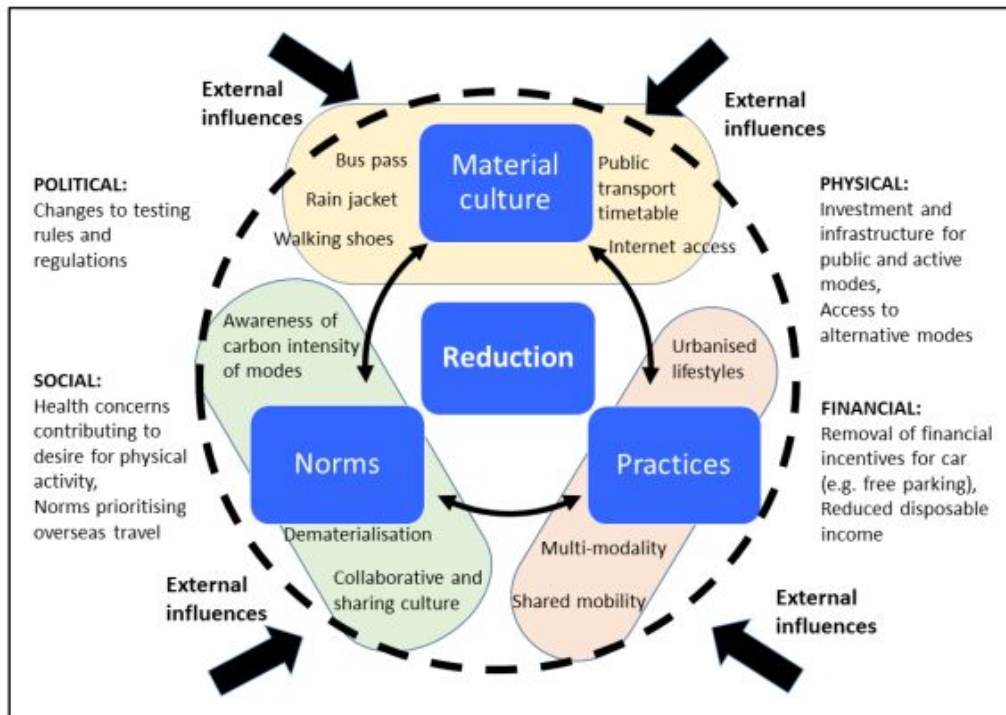
The idea of transport as a political issue may be more about bringing attention to power dynamics, who has influenced and benefited from current defaults and who has not been able to have their perspectives considered yet. In this way, repoliticising transport policy issues is effectively about bringing an equity or fairness lens to discussions.

Shift from car-centric defaults

Some researchers now believe that, following several decades of automobile promotion and associated car-centric urban planning, public sentiment is shifting. Concerns about climate change and public health are moving support for car-free planning more into the mainstream (Zipori & Cohen, 2015). Others note that, considering the interest in car-free developments but the difficulty in making ideas translate to reality, "the hegemonic 'system' of automobility—although it is beginning to crack—continues to exist" (Selzer & Lanzendorf, 2019).

Changing social norms in some areas and demographic groups means that ideas about freedom and independence, previously associated with car use, can now be used to describe active or public transport options (Hopkins & Stephenson, 2016). There are multiple interacting types of influence that drive change towards a more multi-mobility culture, as represented below.

FIGURE 3 An Emergent Multi-Mobility Culture



Source: Hopkins and Stephenson (2016).

Example: Munich

It is argued that switching from a transport systems discourse to a currently less-embedded discourse about everyday mobility culture would help move the focus from the car as a default for planning needs (Tschoerner-Budde, 2019). Munich is a city that, over several decades, has invested strongly in cycling infrastructure and now claims a high proportion of daily travel done by bicycle. A study of the policy-making environment that led to this scenario being embedded described several interested parties, from planners to activists, who influenced the development of cycling policy over decades. A key aspect was raising awareness of alternative approaches to urban mobility and acknowledging the competing discourses about what transport planning was for (moving more vehicles on roads or enabling the optimal daily mobility solutions for individuals and the environment).

From the 1980s, transport planners started to include measures to promote more environmentally friendly transport modes alongside continued planning for car traffic. They used terms such as “traffic calming” – reducing traffic through neighborhood areas – and shifting to “people oriented” (rather than “traffic-oriented”) urban development. A Green political party that heavily promoted cycling policies also became active from the 1980s. Another group called Green City started as a more radical organisation promoting alternative urban lifestyles without cars. They then became a professional non-profit organisation aiming to connect citizens with decision making. The researcher summarises, however, that the green-oriented advocates:

... were unable to foster a larger change in how cycling was conceptualized within the local administration, among political actors, and within the media and larger public opinion. What these actors began to bring forward, though, was a discussion on reorganizing public space and the issue of (in)equality in everyday mobility and in transport planning. In other words, they fostered a larger discussion on promoting cycling as a social issue. (Tschoerner-Budde, 2019)

More recently in Munich during the past decade, city authorities have been actively promoting cycling and aim to foster a new mobility culture. Some transport plans such as cycling streets have had little to do with changing transport flow but have been enacted, in consultation with neighbourhood council groups, to increase the visibility of everyday cycling in urban life.

Officials have reflected that they needed to lead “with the head and then the heart”, meaning bringing factual rationales to discussions but acknowledging the social realities. An example of this balance was seen when policy makers proposed a marketing campaign to persuade residents of the benefits of cycling instead of driving. The Green party representatives objected to the individual choice framing of such a campaign, arguing that laying out “rational logic” for cycling was not enough and that the emotional component needed to be addressed as well. Subsequently, plans for promotion of cycling shifted focus to:

... systematically develop ‘a cycling-friendly climate’ and ‘a positive image of cycling’. In a way, policymakers took the focus from the bicycle as the object of planning and began focusing more on its physical and cultural context of use. (Tschoerner-Budde, 2019)

This case study is, overall, presented as an example of shifting transport policy making from technically driven and rational to a socially driven approach to shaping mobility culture.

Countering dominant discourses: recommendations

Vision-focused framing replacement: look at what people want to achieve by (currently) driving rather than all the other meanings associated with car use.

If automobility is framed in a way that focuses on what people are trying to achieve, rather than an essentialised love affair, could arguments against the proliferation of automobility take a different trajectory? (Henderson, 2009)

Talk about who benefits from current approaches and how to ensure more people experience more benefits. Where relevant, acknowledge historically uneven power and influence over planning decisions (naming agents: who has enacted barriers to change and why?). This could include noting the influence that industry has exerted on prior planning decisions.

Emphasise that current defaults do not need to be set forever. When talking about climate change and the economy, based on their framing research, Public Interest in the UK recommend that a metaphor of reprogramming be used:

What we need to emphasise is that climate change is a result of how we've designed the economy, and can therefore be approached with a new mindset and an ambitious redesign.³

Concentrate less on values as they relate to individual behavioural choices and more on values as they relate to equitable infrastructure provision.

Be particularly careful of invoking in-group/out-group values by, for example, promoting the virtues of cyclist identity over other people's behaviours and lifestyle options.

A frame developed by the FrameWorks Institute and found to be most effective for promoting understanding of environmental health work could be useful here. This is the fairness across places/opportunity for all frame, which emphasises:

... the importance of giving everyone equal access to environmental conditions that foster positive human health. (Simon, Kendall-Taylor & Lindland, 2013)

³ <https://publicinterest.org.uk/talking-climate-justice/#more-10744>

Engagement approaches

Techniques for discussing visions for future transport options

A key challenge for public conversation about future transport visions is to keep everyone focused on the bigger picture, longer-term needs and changes. It is natural to relate proposed changes to the issues that we are immediately experiencing and to arguments we have already heard. At the same time, although significant shifts to the system may produce the most long-term benefits, they can be a harder political sell than simply tweaking existing systems (Moradi & Vagnoni, 2018). Systems change ultimately requires people to become comfortable thinking outside the current defaults and seeing change as possible.

Approaches to collaborative stakeholder engagement and associated communications

The World Roading Authority (PIARC) recently developed guidelines for public messaging about transport issues. They recommend that messages to the general public should:

- make environmental issues seem easy and normal
- make people realise what they have already achieved
- make people see the bigger picture about reducing pollution from roads
- appeal to “heart, minds, national pride and purse” (PIARC, 2019).

It is possible some of the latter recommendations apply more in certain cultures or audience segments.

PIARC also identified several messages to avoid, being:

- emphasising actions that seem obscure or not achievable
- overloading people with instructions
- making people feel bad for things they cannot do (PIARC, 2019).

In other words, these recommendations align with concerns in other literature that messages about complex transport and environment issues should not overplay individual choice framing.

The UK Foresight Future of Cities project and Liveable Cities research consortium, collaborating on “a novel aspirational futures methodology”, found several effective techniques for exploring future visions with stakeholders:

- Visual representations: satellite maps proved useful for setting the context for discussion about aspirations for futures. However, maps presented along with more information (such as demographics and current land access) proved distracting. They tend to constrain thinking towards present issues.
- Selecting the scale at which to think about implementation and the order in which to introduce consideration of different scales: the authors found that it was most constructive to start with larger-scale considerations and move in.

... it is suggested that Environment and Resources be addressed first as the environment necessarily provides a fixed boundary – one that needs protecting – and this would sensibly be followed by People and Community, with Work and Economy coming last. This sequence follows the nested concept of sustainability in which concentric circles show economy inside society inside environment, while adopting it removes the economic constraints from being considered until the end of the process. (Rogers & Hunt, 2019)

This vision-clustering exercise is further explained in the project's documentation. Here, the three options for sequences of consideration and the related emphases are presented:

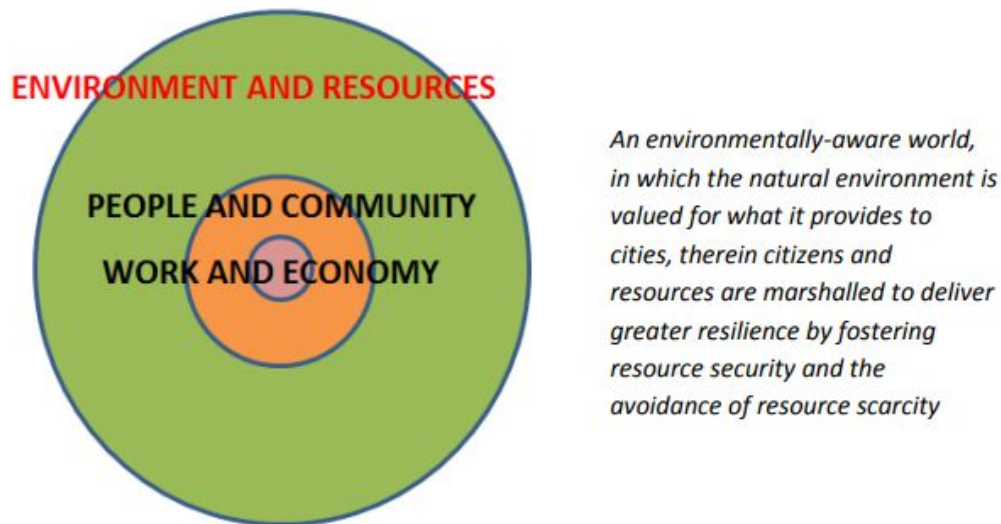


Figure 1. Environment and Resources first.

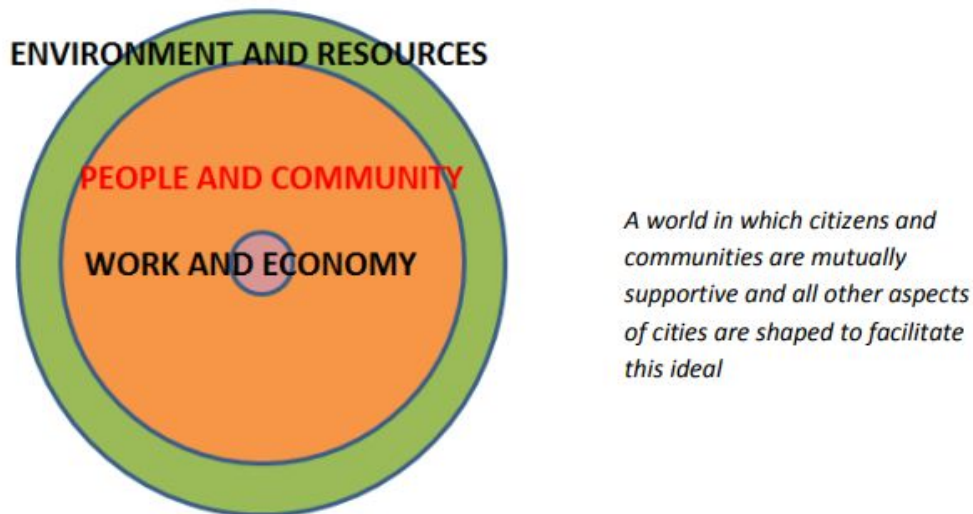


Figure 2. People and Community first



A super-connected world in which the economy, trade and the world of work is prioritised

Figure 3. Work and Economy first

Source: Hunt and Rogers (2015)

- Creating an extreme vision, shaped by priorities rather than imagined real-life constraints helps make people more open to change – “not only to think ‘what if?’, but also ‘why not?’” (Rogers & Hunt, 2019)

Relating to the last point, an approach with some potential (although, from the current literature, more theoretical than tested) concerns creating “utopian thinking” future visions. This exercise, the authors argue, has great potential to identify solutions to mobility issues. They found that existing images of sustainable futures did not adequately account for the social implications and tensions associated with shifts towards sustainability, thus that “social utopian” visions, including consideration of diversity and equity, have potential to shift transport planning away from being perceived as a technocratic exercise and more to something that members of the public can see themselves engaging with and helping to shape. (Timms, Tight & Watling, 2014)

In a potentially high-conflict policy area, more collaborative stakeholder dialogue can lead to better policy choices than adversarial processes do. Collaborative stakeholder dialogue is a tool that can reconcile stakeholder interests, balance unequal power and reportedly also enable a shift from economic growth-focused policy to “a broader focus that better integrates environmental, social and economic considerations” (Baumann & White, 2012).

Visioning workshops in Sydney and Melbourne explored views on preferred urban and low-carbon futures in order to consider the frames that were drawn on. These frames are copied below.

Table 8. Summary of identified frames.

Frame	Diagnostic Framing	Prognostic Framing
Localised urban sustainability	Urban low-carbon transitions and resilience requires a new logic of urban (re)development, which incorporates greater localised self-reliance.	<ul style="list-style-type: none"> • Self-reliance, distributed systems. • Transformation of precincts and/or suburbs (citizen-led) via localised emergent mobilisation and community engagement. The state acts as an enabler, changing planning frameworks and enabling "polycentric" forms.
Radical shifts in political economy and consumption	The climate change problem is a symptom of deeper issues with existing socio-economic systems. Longer-term sustainability and resilience requires socio-economic transformations.	<ul style="list-style-type: none"> • Radical changes to patterns of consumption and reorganisation of the structure of economies. • Institutional transformation required for urban low-carbon transitions
Digital lives and "green Orwellianism"	Social and technological barriers to changing existing high-carbon behaviours (e.g., travel, meat-intensive diets, material consumption).	<ul style="list-style-type: none"> • Use of informational and "smart" technologies to enable major shifts from high-carbon to low-carbon behaviours and to drive such changes.
Greening and radically adapting the urban form	Urban environmental risks associated with climate change, are presenting cities with significant, emerging challenges (e.g., adaptation to dynamic new climate risks).	<ul style="list-style-type: none"> • "Mitigative adaptation": Adapt urban form to address climate change and risks; exploit mitigation co-benefits (e.g., reduced energy use) • Creatively repurposing existing urban structures and existing buildings.
Changes to city-scale "hard" infrastructure and large-scale systems	Urban and broader low-carbon transitions demand major changes to public infrastructure and associated enabling "hard" infrastructure.	<ul style="list-style-type: none"> • New city-scale, regional and national infrastructure ("technical fixes") to increase the resilience of infrastructure, and support low-carbon living.

Source:

The researchers found that localised urban sustainability was the dominant frame of those working in local government or specific precincts, radical shifts in political economy and consumption was the dominant frame of participants from social enterprises, NGOs and the research sector, employees of the state government emphasised advancing resilience and climate change mitigation by greening and adapting the urban form (Frame 4), while those who worked for built environment or large infrastructure-related consulting firms emphasised changes to city-scale hard infrastructure and large-scale systems (Frame 5).

The range of frames discussed found potential for both frame conflict and alignment (i.e. frames crafted to resonate with different groups of people). Among the conclusions was the idea that visioning practices will be most successful if they either involve people with similar perspectives, or are run in a way to allow some conflict:

The diverse ways that actors frame such problems also means that if a sustainable city-related visioning process aims to achieve consensus the process will either: need to allow for framing contests (by welcoming or making room for them) and achieve a deeper level of frame reflection and associated reframing; or it must involve participants from similar institutional and life settings (but those actors will necessarily have a selective and partial understanding of the problems being addressed). (McGrail, Gaziulusoy & Twomey, 2015)

Framing visions for transport mode shift

Metaphors used in the framing of new transport system features can ideally communicate multiple rationales for the change. A study of light rail in European cities found that, while many metaphors were used in the development process, the one that stuck in several cities was light rail as the backbone of public transport and urban development. While the light rail development

was associated with ideals about changing car-centric city planning, the metaphor may have helped to generate support from those who prioritised developing the urban environment (Olesen, 2014).

Framing climate change, mobility and land use policy as a health issue is gaining increasing attention, with more health organisations and advocates getting involved with public policy debates (Adlong & Dietsch, 2015; Harris et al., 2016). It is a fair assumption that increasing public familiarity with the health framing is one factor leading to increasing awareness of effects of vehicle congestion and active transport for health and may therefore mobilise support for change at least among certain sectors of society.

Discussing visions for change: recommendations

Point to social proof - showing examples of what has already been achieved either locally or in other places with similar issues.

Start with idealistic or extreme visions. Emphasise the big-picture benefits that are desired.

Do not use fear-based framing if people don't have efficacy to change systems, but do point to how collective action can change systems.

Do not over-consult in a token way. Involve communities to understand their needs and priorities for the future.

Use collaborative dialogue techniques and/or allow for conflicting frames to be brought to discussions. Be aware of the likely range of frames.

Experimentation and prototyping

When people can see and experience examples of change, perhaps implemented on a smaller scale or pilot, they may be able to grasp the potential benefits more readily.

Disruptions to the usual routine, in which people may need to try alternative approaches to transport or using urban space, can also become prompts to help people see change as possible. These disruptions could be traumatic – such as an earthquake – or a sudden onset of unusual personal circumstances leading to willingness to try an alternative that previously seemed unrealistic (Shaw, 2019). Disruptions that enable alternatives to seem possible are called “liminal moments” – “brief windows (often induced by a sense of disorientation) when people are able to glimpse an alternative system of social organisation” (Zipori & Cohen, 2015).

It is possible to experiment with alternative urban mobility options using less-stressful types of disruptive events, for example, planned car-free city centre events in which people are invited to try using the streets in a different way.⁴

Efforts to make city centres car-free commonly meet with initial opposition, and that change happens gradually. Part of making change more palatable involves demonstrating, via smaller pilot projects, how it could work. In Barcelona, following significant opposition to the idea of blocking off streets from car access, one area was blocked off, and residents ended up appreciating the extra space available to pedestrians and cyclists. Several other “superblocks” have since been implemented around the city. Further instalment of these superblocks has great potential to improve health among city residents. However, researchers caution that implementation would need careful planning taking equity into account so as not to shift car congestion and associated problems into the less wealthy neighbourhoods (Mueller et al., 2019).

A similar argument could be made for bike lane projects in New Zealand, where “bikelash” or resistance to changing road infrastructure to allow more cycling has been observed in several sub/urban scenarios. There are several causes of bikelash, including conservatism and worries about economic impacts on one hand and gentrification or unequal access on the other. Those studying bikelash conclude that community engagement is vital to reducing it, although they also note that, unlike in other countries, New Zealand bike lane developers have not employed testing of temporary bike lanes as much. This appears to be due to cost concerns. However, the authors suggest that building bike lanes in a more iterative (presumably implying, easy to tweak) manner:

... may provide opportunities to refine designs with direct community involvement, and build familiarity and comfort in the community with road changes, leading eventually to better-accepted and more-effective bike lanes. (Field et al., 2018)

Urban Livings Labs have become popular in some parts of Europe and to an extent have been tried in New Zealand. They represent an intention to engage in collaborative, experimental sustainability initiatives with communities. Ideally, they should help to develop urban sustainability changes that are co-designed with the end users (that is, the local communities), although the definition of “living lab” does not appear to be used consistently, so in some cases they may not be truly different from top-down development approaches (Steen & van Bueren, 2017). The literature does not indicate whether particular messaging or engagement aspects of living labs have helped with modal shifting.

Approaches to be wary of

Internationally, public participation in mobility planning appears to be gradually increasing. However, questions remain over how technical information is explained and discussed and to what extent the public are enabled to bring their perspectives on social, political, ethical and

⁴ <https://www.london.gov.uk/events/2019-09-22/reimagine-your-city-car-free>

cultural issues to challenge and influence mobility planning decisions (Lindenau & Böhler-Baedeker, 2014).

The studies we found contained a number of cautionary conclusions regarding public communication about shifting transport modes. Framing and messaging approaches to be wary of are discussed here.

Didactic messaging

Efforts to change norms around transport options may involve selling a story or setting up public participation opportunities. However, researchers analysing public participation initiatives about transitions to mitigate climate change in Belgium cautioned that education on sustainable options risked becoming a “topdown, expertocratic transfer of information in the pursuits of behavioural adjustment”. Even a more overtly participatory initiative aiming to encourage “learning from each other” still ended up being “an instrument for persuasion and normalisation” in which it was clear that there were expectations of who was expected to learn from whom (Van Poeck, Vandenabeele & Goeminne, 2017).

Similarly, analysis of public education campaigns encouraging “eco-mobile” stakeholders in sustainable mobility in France found that the design work combined “childish imagery with a didactic, guilt-laden tone” (Reigner & Brenac, 2019).

Frames to avoid: cost/savings

Research on cycling policy and infrastructure has tended to be framed by cost-benefit analyses, which do not account for the effects of advocacy, policy windows or champions of policy change (Weber, 2014).

An analysis of framing in the development of Montreal’s BIXI bikesharing system concluded that it would be politically risky to promote expectations about financial costs and savings associated with the scheme. This was partly because, although the scheme did represent overall benefits to the urban transport system, neither was it free to taxpayers, so concentrating on the money side could be less productive.

Framing these systems as public investments rather than a “free ride” for taxpayers would be a more accurate, and potentially effective, way to promote their development in the context of the current push for sustainable transportation policy in cities around the world. (Béland, 2014)

This argument may also apply to bikesharing scenarios, where concentrating messages on specific estimated costs and benefits (rather than the project’s contribution to an overall investment in city liveability) could embed resistance to the idea of spending anything on the project.

Frames to avoid: “smart“

Discourses about smart technology or mobility or urban development tend to focus on new technology and its potential uses. As noted with regards to sustainability narratives, an emphasis on technological fixes can distract from the bigger picture, i.e., the underlying causes of the environmental or transport system problems. Those who raise cautions about smart discourse do not appear to say that there is no place for technological solutions, rather that there is a risk that technology industries could end up championing certain interpretations of solutions, separate from those developed by planners trying to consider future sustainability (Lyons, 2018). There is also a risk that ostensibly co-designed solutions focusing on smart technology can be less inclusive than intended:

The use of living labs in cities may also raise questions about the inclusiveness and democratic accountability of the selection of areas for living labs, and about the focus of the innovation. Indeed, many innovations tend to be technological and are driven by ICT and decentralized technologies with ambitions to become “smart” and “low carbon”. (Steen & van Bueren, 2017)

Avoiding unhelpful frames: recommendations

Frame replacements: avoid guilt, individual responsibility, educational or corrective, “technology will save us”, financial cost/benefit messages – what’s left?

The implication here is that more productive messages concentrate on what communities want to achieve in the future and then discuss the possible solutions (i.e. appropriate infrastructure and public willingness to use it).

Research on framing economic arguments by Australian Progress has similarly found that mentioning money turns persuadable audiences away. They recommend instead stressing “outcomes for people, NOT dollar output”. For environmental issues, rather than leading with the costs of not acting, leading with “We can continue to enjoy our lives in harmony with our planet if ...”⁵ (in this case: “we can use less polluting ways to move around our cities”).

Accessibility planning and equity

Equity concerns arise in many of the studies identified in this review. Some researchers see a tension between equity and environmental concerns, particularly the need to provide access to all residents while reducing climate impacts from transport. Equity considerations in planning have been observed to concern immediate access needs (intragenerational equity) but less so intergenerational equity issues regarding who is more affected by climate change (Arsenio, Martens & Di Ciommo). This observation has potential relevance to messaging strategies.

⁵ <https://australianprogress.org.au/how-to-talk-about-economics-a-guide-to-changing-the-story/>

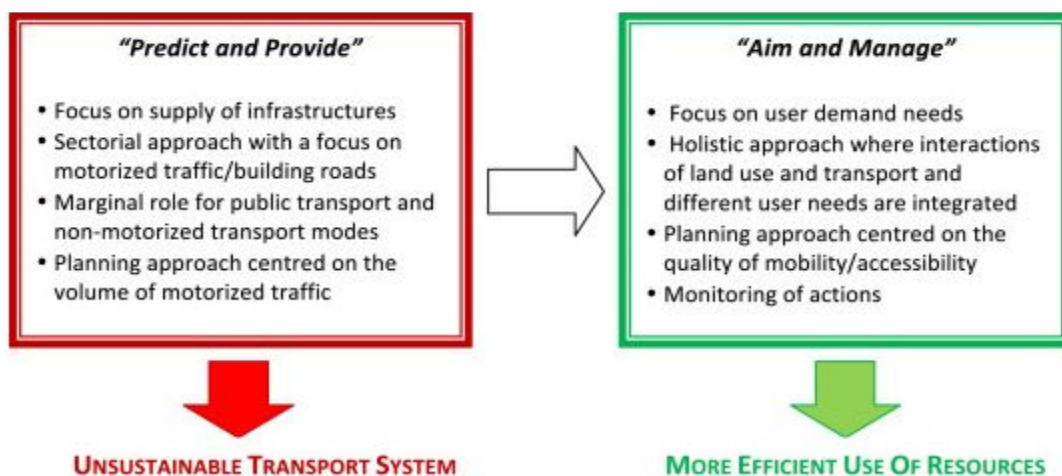
Others have suggested that any sustainability planning should include social sustainability, including equity considerations when adopting rational mobility measures to reduce the environmental impact of transport. This could mean ensuring that environmental initiatives are implemented in a way to mitigate the effects on poorer people (such as removing older vehicles, which if no affordable alternative was offered would disadvantage those who can only afford old vehicles). Cities including Vancouver have accordingly reframed sustainability planning to incorporate social sustainability, defining it as dealing with “complex issues such as quality of life, health, equity, liveability and social inclusion” (Grieco, 2015).

A social justice approach could shift transport planning priorities from cost-benefit analysis (for example, travel time savings), which tend to benefit the more privileged, to accessibility gains, meaning access to transport would be distributed more equitably. It is suggested that this would mean reframing mobility priorities from meeting demand to meeting need (Martens, 2006).

Another suggested reframing, used by urban social movements advocating for mobility rights, involves combining references to rights to mobility with the rights to the city – “the possibility to physically access the city, to the ability to shape the city and the decision about its future” (Verlinghieri & Venturini, 2018).

Frames that relate to equity include fairness and justice. These frames particularly resonate with efforts to involve affected communities in decision making. For example, the British New Economics Foundation is working to build a community-led common cause to shift towards a lower-carbon economy, under the name of a “just transition”.⁶

Overall, prioritising equity considerations in both planning and communication about planning has potential to lead to more inclusive and efficient transport systems.



Source: Arsenio, Martens and Di Ciommo (2016).

⁶ <https://neweconomics.org/2018/11/working-together-for-a-just-transition>

Discussing planning and equity: recommendations

Talk about people's needs rather than consumers' demands.

Talk about fairness and the right to mobility as part of the right to participate in society.
Envision a society in which mobility systems helps all people participate without needing to rely on cars.

Do not talk about transport policy in isolation from all the others – town planning, housing, social spaces, health and other services – that contribute to equitable access to wellbeing and efficient use of transport resources.

Bibliography

Adlong, W. & Dietsch, E. (2015). Environmental education and the health professions: Framing climate change as a health issue. *Environmental Education Research*, 21(5), 687-709.

Arsenio, E., Martens, K., & Di Ciommo, F. (2016). Sustainable urban mobility plans: Bridging climate change and equity targets? *Research in Transportation Economics*, 55, 30-39.

Banister, D. & Hickman, R. (2013). Transport futures: Thinking the unthinkable. *Transport Policy*, 29, 283-293.

Baumann, C. & White, S. (2012). Making better choices: A systematic comparison of adversarial and collaborative approaches to the transport policy process. *Transport Policy*, 24, 83-90.

Baumann, C. & White, S. (2015). Collaborative stakeholder dialogue: A catalyst for better transport policy choices, *International Journal of Sustainable Transportation*, 9(1), 30-38, doi: 10.1080/15568318.2012.720357

Béland, D. (2014). Developing sustainable urban transportation. *International Journal of Sociology and Social Policy*, 34(7/8), 545-558.

Bothos, E., Mentzas, G., Prost, S., Schrammel, J., & Röderer, K. (2014). Watch your emissions: Persuasive strategies and choice architecture for sustainable decisions in urban mobility. *PsychNology Journal*, 12(3), 107-126.

de las Heras-Rosas, C.J. & Herrera, J. (2019). Towards sustainable mobility through a change in values: Evidence in 12 European countries. *Sustainability*, 11(16), 4274.

Doughty, K. & Murray, L. (2016). Discourses of mobility: Institutions, everyday lives and embodiment. *Mobilities*, 11(2), 303-322. doi: 10.1080/17450101.2014.941257

Dowling, R. (2018). Smart mobility: Disrupting transport governance? In G. Marsden & L. Reardon (Eds.) *Governance of the Smart Mobility Transition* (pp. 51-64). Bradford, UK: Emerald Publishing Limited. <https://doi.org/10.1108/978-1-78754-317-120181004>

Fenton, P. & Gustafsson, S. (2015). Contesting sustainability in urban transport: Perspectives from a Swedish town. *Natural Resources Forum*, 39, 15-26. doi:10.1111/1477-8947.12061

Field, A., Wild, K., Woodward, A., Macmillan, A., & Mackie, H. (2018). Encountering bikelash: Experiences and lessons from New Zealand communities. *Journal of Transport & Health*, 11, 130-140.

Forbes, P. J., Gabrielli, S., Maimone, R., Masthoff, J., Wells, S., & Jylhä, A. (2014). Towards using segmentation-based techniques to personalize mobility behavior interventions. *EAI Endorsed Transactions on Ambient Systems*, 1(4).

- Green, J., Steinbach, R., & Datta, J. (2012). The travelling citizen: Emergent discourses of moral mobility in a study of cycling in London. *Sociology*, 46(2), 272–289.
<https://doi.org/10.1177/0038038511419193>
- Grieco, M. (2015). Social sustainability and urban mobility: Shifting to a socially responsible pro-poor perspective. *Social Responsibility Journal*, 11(1), 82-97.
<https://doi-org.helicon.vuw.ac.nz/10.1108/SRJ-05-2014-0061>
- Harris, P., Kent, J., Sainsbury, P., & Thow, A. M. (2016). Framing health for land-use planning legislation: A qualitative descriptive content analysis. *Social Science & Medicine*, 148, 42-51.
- Henderson, J. (2009). The politics of mobility: De-essentializing automobility and contesting urban space. In J. Conley & A. T. McLaren (Eds.). *Car troubles: Critical studies of automobility and auto-mobility* (pp. 147-164). Burlington, VT: Ashgate.
- Hopkins, D. & Stephenson, J. (2016). The replication and reduction of automobility: Findings from Aotearoa New Zealand. *Journal of Transport Geography*, 56, 92-101.
- Hunt, D. & Rogers, C. (2015). *Aspirational city futures: Three models for city living*. London, UK: Government Office for Science.
- Hysing, E. (2009). Greening transport: Explaining urban transport policy change. *Journal of Environmental Policy & Planning*, 11(3), 243-261, doi: 10.1080/15239080903056417
- Kane, M. & Whitehead, J. (2017) How to ride transport disruption – a sustainable framework for future urban mobility, *Australian Planner*, 54(3), 177-185. doi: 10.1080/07293682.2018.1424002
- Kębłowski, W. & Bassens, D. (2018). “All transport problems are essentially mathematical”: The uneven resonance of academic transport and mobility knowledge in Brussels. *Urban Geography*, 39(3), 413-437.
- Kębłowski, W., Bassens, D., & Van Criekingen, M. (2016). *Re-politicizing transport with the right to the city: An attempt to mobilise critical urban transport studies*. Brussels, Belgium: Vrije Universiteit Brussel, Cosmopolis.
- Kurniawan, J. H., Ong, C., & Cheah, L. (2018). Examining values and influences affecting public expectations of future urban mobility: A Singapore case study. *Transport Policy*, 66, 66-75.
- Lindenau, M. & Böhler-Baedeker, S. (2014). Citizen and stakeholder involvement: A precondition for sustainable urban mobility. *Transportation Research Procedia*, 4, 347-360.
- Loukopoulos, P. & Scholz, R. W. (2004). Sustainable future urban mobility: Using ‘area development negotiations’ for scenario assessment and participatory strategic planning. *Environment and Planning A: Economy and Space*, 36(12), 2203-2226.

- Lyons, G. (2018). Getting smart about urban mobility: Aligning the paradigms of smart and sustainable. *Transportation Research Part A: Policy and Practice*, 115, 4-14.
- Martens, K. (2006). Basing transport planning on principles of social justice. *Berkeley Planning Journal*, 19(1).
- McCue, P. (2017). Walking policy steps – the policy development process for the first state walking target in New South Wales, Australia. In C. Mulley, K. Gebel & D. Ding (Eds.), *Walking: Connecting Sustainable transport with health* (pp. 233-248). Bradford, UK: Emerald Publishing Limited. <https://doi.org/10.1108/S2044-994120170000009014>
- McGrail, S., Gaziulusoy, A. I., & Twomey, P. (2015). Framing processes in the envisioning of low-carbon, resilient cities: Results from two visioning exercises. *Sustainability*, 7(7), 8649-8683.
- Moradi, A. & Vagnoni, E. (2018). A multi-level perspective analysis of urban mobility system dynamics: What are the future transition pathways? *Technological Forecasting and Social Change*, 126, 231-243.
- Mueller, N., Rojas-Rueda, D., Khreis, H., Cirach, M., Andrés, D., Ballester, J., ... & Milà, C. (2019). Changing the urban design of cities for health: The superblock model. *Environment International*, 105132.
- Nordfjærn, T., Şimşekoğlu, Ö., Lind, H. B., Jørgensen, S. H., & Rundmo, T. (2014). Transport priorities, risk perception and worry associated with mode use and preferences among Norwegian commuters. *Accident Analysis & Prevention*, 72, 391-400.
- Olesen, M. (2014). Framing light rail projects: Case studies from Bergen, Angers and Bern. *Case Studies on Transport Policy*, 2(1), 10-19.
- Pangbourne, K. & Masthoff, J. (2016). *Personalised messaging for voluntary travel behaviour change: Interactions between segmentation and modal messaging*. Bristol, UK: Universities Transport Studies Group.
- PIARC. (2019). *Best practice guide to air quality in relation to road operations*. Paris, France: PIARC.
- Pisano, U., Lepuschitz, K., & Berger, G. (2014). *Framing urban sustainable development: Features, challenges and potentials of urban SD from a multi-level governance perspective*. ESDN Quarterly Report 31. Vienna, Austria: European Sustainable Development Network.
- Priester, R., Miramontes, M., & Wulfhorst, G. (2014). A generic code of urban mobility: How can cities drive future sustainable development? *Transportation Research Procedia*, 4, 90-102.
- Reigner, H. & Brenac, T. (2019). Safe, sustainable ... but depoliticized and uneven: A critical view of urban transport policies in France. *Transportation Research Part A: Policy and Practice*, 121(C), 218-234.

- Richards, R., Murdoch, L., Reeder, A. I., & Rosenby, M. (2010). Advocacy for active transport: Advocate and city council perspectives. *International Journal of Behavioural Nutrition and Physical Activity*, 7, 5. doi:10.1186/1479-5868-7-5
- Rogers, C. D. & Hunt, D. V. (2019). Realising visions for future cities: An aspirational futures methodology. *Proceedings of the Institution of Civil Engineers – Urban Design and Planning*, 172(4), 125-140.
- Sallis, J. F., Bull, F., Burdett, R., Frank, L. D., Griffiths, P., Giles-Corti, B., & Stevenson, M. (2016). Use of science to guide city planning policy and practice: How to achieve healthy and sustainable future cities. *The Lancet*, 388(10062), 2936-2947.
- Selzer, S. & Lanzendorf, M. (2019). On the road to sustainable urban and transport development in the automobile society? Traced narratives of car-reduced neighborhoods. *Sustainability*, 11(16), 4375.
- Shaw, C. (2019). *Bikes are the new cars*. Retrieved from <https://thespinoff.co.nz/society/20-10-2019/bikes-are-the-new-cars/>
- Simon, A., Kendall-Taylor, N., & Lindland, E. (2013). *Using values to build public understanding and support for environmental health work*. A FrameWorks research report. Washington, DC: FrameWorks Institute.
- Smith, M. (2016). Cycling on the verge: The discursive marginalisation of cycling in contemporary New Zealand transport policy. *Energy Research & Social Science*, 18, 151-161.
- Spickermann, A., Grienitz, V., & Heiko, A. (2014). Heading towards a multimodal city of the future?: Multi-stakeholder scenarios for urban mobility. *Technological Forecasting and Social Change*, 89, 201-221.
- Steen, K. & van Bueren, E. (2017). The defining characteristics of urban living labs. *Technology Innovation Management Review*, 7(7), 21-33.
- the share of travel by public transport, walking and cycling*. Wellington: Waka Kotahi NZ Transport Agency.
- Timms, P., Tight, M., & Watling, D. (2014). Imagineering mobility: Constructing utopias for future urban transport. *Environment and Planning A: Economy and Space*, 46(1), 78-93. <https://doi.org/10.1068/a45669>
- Tschoerner-Budde, C. (2019). *Sustainable mobility in Munich: Exploring the role of discourse in policy change*. Wiesbaden, Germany: Springer VS.
- Van Poeck, K., Vandenabeele, J., & Goeminne, G. (2017). Making climate change public? A dramaturgically inspired case-study of learning through transition management. *International Journal of Global Warming*, 12(3-4), 366-385.

Verlinghieri, E. & Venturini, F. (2018). Exploring the right to mobility through the 2013 mobilizations in Rio de Janeiro. *Journal of Transport Geography*, 67, 126-136.

Waka Kotahi NZ Transport Agency. (2019). *Keeping cities moving: Increasing the wellbeing of New Zealand's cities by growing* Weber, J. (2014). The process of crafting bicycle and pedestrian policy: A discussion of cost-benefit analysis and the multiple streams framework. *Transport Policy*, 32, 132-138.

Wu, S., Bai, Q., & Sengvong, S. (2018). GreenCommute: An influence-aware persuasive recommendation approach for public-friendly commute options. *Journal of Systems Science and Systems Engineering*, 27(2), 250-264.

Zipori, E. & Cohen, M. J. (2015). Anticipating post-automobility: Design policies for fostering urban mobility transitions. *International Journal of Urban Sustainable Development*, 7(2), 147-165. doi: 10.1080/19463138.2014.991737