

**MOBILITY AS AGENCY:
PERSPECTIVES FROM SOUTH AFRICA,
CHINA, AND THE UNITED STATES**

**BY
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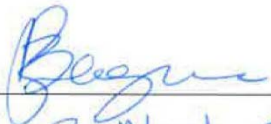
A thesis submitted in fulfilment of the requirements for the
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DECLARATION

I declare that this is my own unaided work. Where research and dissemination was undertaken collaboratively, this has been carefully acknowledged. This dissertation is being submitted for the degree of PhD in Psychology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at another university.

Signed:



Date:

3 March 2020

“To love. To be loved. To never forget your own insignificance. To never get used to the unspeakable violence and the vulgar disparity of life around you. To seek joy in the saddest places. To pursue beauty to its lair. To never simplify what is complicated or complicate what is simple. To respect strength, never power. Above all, to watch. To try and understand. To never look away. And never, never to forget.”

(Arundhati Roy 2016, p. 95)

ABSTRACT

We must develop more sustainable ways to be mobile, yet four main hurdles challenge sustainable mobility. The first is the need for individuals and groups to adopt the fundamentally different attitudes, values, and norms upon which sustainable mobility are premised. The second is the reticence to abandon infrastructures and industries that are clearly unsustainable. The third is about the limits imposed by mono-focal mobility approaches that tend to favour either socio-technical or psychosocial interventions. The fourth is the lack of integration, which prevents the creation of an interdependent mobility system that associates psychosocial, sociocultural, and technological dimensions that would give rise to more sustainable mobility practices. The purpose of this research is to explore the potential contribution psychology can make to developing sustainable mobility solutions that transcend some of these limitations.

Psychology has played an important role in addressing societal challenges for many decades. The field has at its disposal extensive knowledge about individuals and their practices, and given that individual practices are the defining feature of mobility, the field is ideally positioned to contribute to sustainable mobility. Our ability to be mobile serves as one of the primary functions through which we realise our personal, professional, and social goals. Thus, our potential as agents in the world is deeply connected to our ability to be mobile. Accordingly, there exists a fundamental connection between personal agency and individual mobility practices. This research exploits this connection by using Albert Bandura's concept of personal agency and his Model of Triadic Reciprocal

Causation to develop a framework known as ‘mobility as agency’. This framework conceptualises different modes of agency (individual, proxy, and collective) as well as the potential of different types of environments (selected, imposed, or constructed) to facilitate or constrain agentive action in relation to mobility intentions and desired outcomes in order to study mobility practices as dynamic and interdependent agentive practices. Conceptualising and studying the interdependence between different psychosocial dimensions and socio-structural environments that define mobility practices in different contexts offers the opportunity to systematically examine the limitations of current sustainable mobility approaches and to explore how these limitations could be overcome.

Using a comparative case study approach, mobility as agency is applied empirically in three research sites to study the mobility practices of car users in regions without developed passenger trains in the United States (US), regular train users in Beijing, China, and Metrorail commuters in the Western Cape of South Africa. A mixed methods approach known as Hermeneutic Content Analysis is used to study how agency unfolds in individual mobility practices. The analyses identify various agentive pathways, which function differentially, and which are systematically connected to different environmental dimensions, thereby illustrating how mobility as agency is inherently psychosocial and functionally dependent on technical and socio-structural environmental dimensions. The argument for a more nuanced understanding of agency as distinct and systematic patterns of reciprocal interactions is based on empirically systematising distinct patterns of reciprocal interaction between preferences and behaviours in relation to specific contextual and cultural dynamics of mobility environments. To date, most studies on personal agency focus on individual agency especially in relation to self-efficacy. By

transcending conventional unidirectional concepts of agency, this research contributes a framework that expands personal agency in line with the Model of Triadic Reciprocal Causation to include the reciprocal interactions between different psychosocial dimensions and socio-structural environments. Furthermore, these findings contribute to the field of sustainable mobility an approach that addresses some of the limitations imposed by focusing on either technical and socio-structural, or psychosocial interventions. Using mobility as agency to examine the interdependencies and conditionalities of mobility practices, this research intends to contribute to advancing psychological research on the dynamic reciprocal relationship between individuals, culture, and environment. In doing so, it proposes a culture-sensitive and context-specific approach to studying sustainable mobility.

Keywords: Sustainable mobility, Albert Bandura, personal agency, Model of Triadic Reciprocal Causation, comparative case study, mixed methods, Hermeneutic Content Analysis, Content Configuration Analysis, Multidimensional Scaling.

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“The owl of Minerva takes its flight only when the shades of night are gathering.”

(Hegel 1820)

CHAPTER ONE

Introduction

The American Psychological Association asserts that psychology is “critical in solving society’s most pressing challenges” (APA 2020). The significance of our current responsibility as psychologists cannot be overstated. Globally, we are confronted with a rapidly changing world. We are facing unprecedented, systemic challenges that include, but are not limited to, food, water, and energy insecurity, global warming and climate change, poverty, and rising inequality within and between nations. Central to these challenges as well as their potential solutions are individuals, social groups, and their well-being. This research attempts to respond to a small cross-sectional slice of these issues by applying psychological theory of how individuals negotiate their way through a highly complex world of mobility. The aim is to explore how psychology can contribute to developing sustainable mobility solutions that transcend the limitations of current hard and soft policy approaches. This chapter begins with an exploration of some of the main theoretical components, after which the problem context in relation to the main ideas defining sustainability more generally and sustainable mobility specifically is introduced. This is followed by examining how psychological principles could be fruitfully connected to sustainable mobility, which leads to the development of the theoretical framework, which guides the empirical inquiry of this research. The methodological approaches are then discussed and this chapter concludes with a description of the layout of the remainder of the thesis.

Sustainability and sustainable development

The United Nations has, for more than three decades, attempted to promote the concept of sustainable development globally. It began with the Brundtland Commission Report in 1987, which defined sustainable development as, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, p. 43). According to the report, sustainable development consists of four dimensions: environment, economy, society, and culture (WCED 1987). As a concept, sustainable development denotes the paradigm of thinking about the various pathways and processes involved in bringing diverse and often divergent environmental, social, and economic considerations into balance with one another (WCED 1987; UNESCO 2015). The term sustainability, while often used interchangeably with sustainable development, refers to the long-term goal/s that ought to be achieved (UNESCO 2015). The definition of sustainable development, introduced by the Brundtland Commission, attracted a global following and still dominates many debates on sustainability today. It is widely accredited as one of the key events which established sustainability more generally and the tripartite model specifically in the international policy arena (for a review on the development of sustainability concepts and debates, see for example Santillo 2007 or Bergman, Bergman, Fernandes, Grossrieder, & Schneider 2018). The tripartite model emphasises the interdependency between economic development, social development, and environmental management or protection (also referred to as the overlapping spheres model or the three-pillar model). Most definitions on sustainability have explicitly or implicitly integrated the three pillars (Elkington 1998; see also Dyllick & Hockerts 2002; Loo 2002; Richardson 2005; Schipper 2002; Thatcher

2012; World Bank 1996; Bergman et al. 2018). Despite its critics, the state-of-the-art model of sustainability is represented in the United Nation's 2030 Agenda for Sustainable Development, which outlines the global development goals to be achieved by 2030. Based on the tripartite model, this agenda divides economic development, social development, and environmental protection into 17 sustainable development goals (SDGs) with 169 targets and 232 indicators. Figure 1, developed by Rockström and Sukhdev (2016), is an illustration of the association between the tripartite model and the 17 SDGs:



Figure 1. The United Nation's 17 Sustainable Development Goals, integrated into a tripartite nested model of sustainability (Rockström & Sukhdev 2016).

Sustainable mobility

The field of sustainable mobility is an attempt to apply sustainability principles to the mobility arena of human activity – the movement of goods, technology, people, and information (Banister 2008; Greene 2001). It is one of the critical areas of sustainability because our mobility represents the best and worst aspects of social and economic development (Banister 2008; Geerken, Vercalsteren & Borup 2009). Mobility profoundly influences the spheres of, and our access to, social networks, such as family and friends, formal, informal, and life-long educational and employment opportunities, and a vast array of economic aspects, which have helped to secure basic needs, well-being, and quality of life, and which have alleviated poverty and ill health for billions of people across the world (Kaufmann, Bergman, & Joye 2004; see also Banister 2008; Greene 2001). If the story of society ended here, our mobility systems would be deemed one of our finest accomplishments. However, these achievements have come at tremendous environmental, social, and political costs. Global mobility patterns have increased at roughly the same rate as economic growth, and they are projected to continue at a similar rate into the future (Greene 2001). This results in a steady rise in “road casualties; pollution; noise; congestion; social isolation; damage to wildlife and the countryside; [and] resource depletion” (Stradling, Meadows, & Beatty 2000, p. 207), or as Geerken, Vercalsteren, and Borup (2009) termed them, the ‘Triple Cs’ – CO₂, congestion, and human casualties. Not only are these the key problems in the mobility domain but they are also some of the biggest challenges of our time. Accordingly, debates in the field of sustainable mobility centre on how societies can reduce the long-term economic, social, and environmental costs of their mobility practices, while at the same time maintaining

an acceptable development momentum (Holden, Linnerud, & Banister 2013, 2017; Banister 2008).

At the broadest level, sustainable mobility is defined within the Brundtland parameters to denote “the ability to meet today’s transportation needs without compromising the ability of future generations to meet their transportation needs” (Richardson 2005, p. 30). Achieving this will require decreasing our dependence on private vehicles (Charlton 2004), encouraging the use of large-scale public transport systems such as trains (IPCC 2007), and reducing the environmental impact of individual mobility behaviour (Holden & Høyer 2005). Essentially, we need to “reduce the need to travel (less trips), to encourage modal shift, to reduce trip lengths and to encourage greater efficiency in the transport system” (Banister 2008, p. 75, see also Holden 2004; Holden & Gilpin 2013). Many cities and regions around the world are implicitly and explicitly adopting these ideals. An example frequently used in urban planning forums, policy documents, and various websites is the green transportation hierarchy (Figure 2), which ranks different mobility types according to their degree of sustainability.

Of significance here is that throughout this thesis, the green transportation hierarchy is used as a proximal representation for sustainable mobility in the academic literature. This hierarchy is used because it is one of the most prominent and well-established models in the field (Banister 2008; Black 2010; Faist 2013; Geerken et al. 2000; Greene 2001; Grieco & Urry 2016; Holden et al. 2013; Novaco 2001; Pirie 2013; Stradling et al. 2000; Richardson 2005; Steg & Tertoolen 1999). It captures well the conceptual overlap in the way authors write about sustainable mobility. This overlap is indicative of the emergent normative (and mostly Eurocentric) agreement of what sustainable mobility entails –

prioritising environmental concerns over economic and social development (Banister 2008; Black 2010; Geerken et al. 2009; Richardson 2005). Another reason for its employment is pragmatic since this hierarchy is widely used to define sustainable mobility in policy documents, forums, and websites around the world.

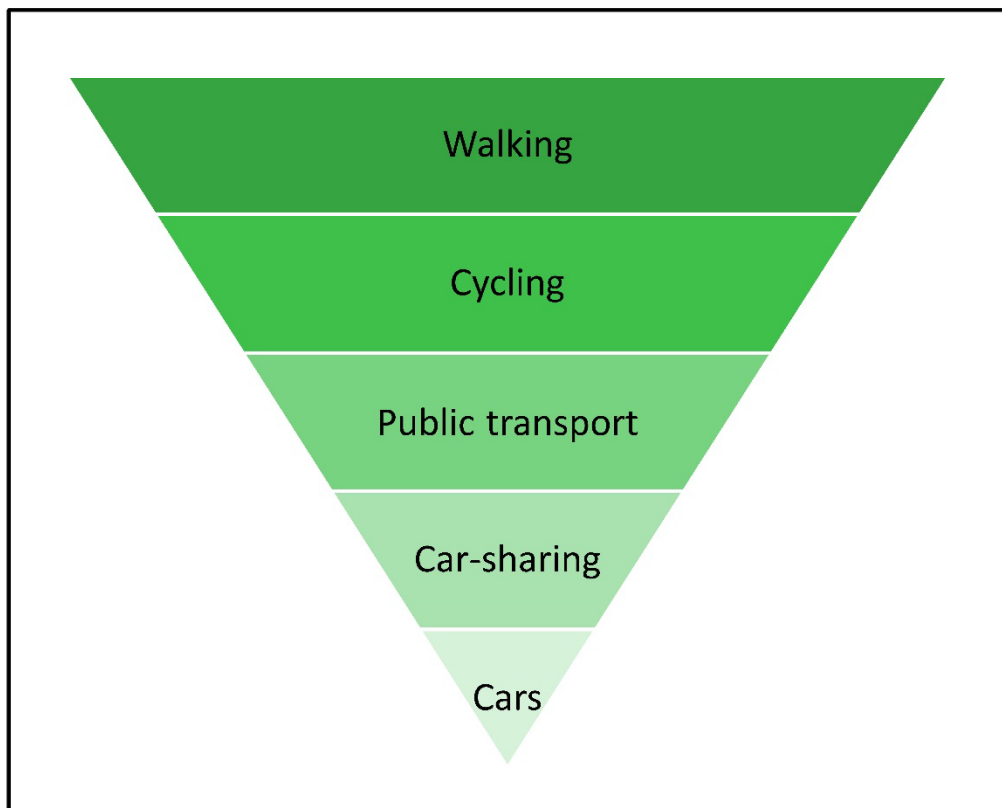


Figure 2. Green Transportation Hierarchy (Bradshaw 1992).

According to the green transportation hierarchy (Figure 2), the most sustainable form of mobility is walking. In second place is cycling, followed by public transport systems including buses, trams, and trains. In fourth place are high-occupancy vehicles (HOVs), which include car-sharing or car-pooling programmes. Ranked last for being the least sustainable form of mobility are single-occupancy, privately owned vehicles. Sustainable

mobility approaches such as the green transportation hierarchy are representative of the contemporary norms and models guiding sustainable mobility. It places a premium on decarbonising, decongesting, and decelerating cities by promoting large-scale public transport or human-propelled mobility modes, and it implicitly focuses on the core notion of de-growth as a movement toward greater sustainability (Bergman & Bergman 2019 see also Banister 2008; Greene 2001). These mobility goals are at least partially implemented by using two types of interventions – hard and soft policy approaches.

Hard policy measures: The lack of elasticity in the existing mobility infrastructure including roads and rails, the lifespan of this infrastructure being measured in decades, as well as the extensive financial resources that have been invested into creating and maintaining it means that changes in the mobility domain remain difficult to navigate or implement. Nevertheless, hard policy approaches focus on technical or socio-structural interventions, which seek to remodel existing or develop new infrastructure to make mobility systems more sustainable (Gehlert, Dziekan, & Gärling 2013; Herring & Roy 2007; Hunecke, Haustein, Grischkat, & Böhler 2007; Novaco 2001). These include technological solutions ranging from well-established mobility infrastructure, such as mass public transit and high-speed rail to new, innovative technologies, such as shared and autonomous mobility systems and electric vehicles (Holden, Linnerud, & Banister 2013, 2017). The considerable financial investments required to implement and maintain new infrastructure, as well as the dependence on raw materials present substantial challenges to these types of interventions (Holden, 2004; Holton 2019). Also problematic is the assumption that societal uptake of new and potentially disruptive mobility technology will be seamless (Grieco & Urry 2016; Herring & Roy 2007). These

challenges render hard policy approaches an unattractive solution that rarely enjoy broad-based political, economic, or public support.

Soft policy measures: Soft policy approaches consist of psychosocial interventions that focus on individual and group behaviour and preferences in order to encourage the adoption of more sustainable practices (Chatterjee & Bonsall 2009; Graham-Rowe, Skippon, Gardner, & Abraham 2011; Stanton et al. 2013; Steg & Tertoolen 1999). Interventions use awareness and information campaigns, incentive programmes, public appeals, and focus groups to foster individual or collective attitudes, values, and behaviour change in line with sustainable mobility ideals (Diniz, Duarte, Peres, de Oliveira, & Berndt 2015; Gehlert et al. 2013; Hunecke et al. 2007; Novaco 2001; Olsson, Huck, & Friman 2018; Rose 2008; Steg & Vlek 2009). A major advantage of soft policy approaches lies in their ability to offer solutions that can be implemented at significantly lower cost and with less disruption than most hard policy measures (Grieco & Urry 2016; Stanton et al. 2013).

The contribution psychology has made thus far is most evident in relation to soft-policy measures. This is clear especially in the applied field of the psychology of transport, where studies focus on “travel-mode decisions, driver attitudes and performance, the interplay between work and family, emotional wellbeing, and major societal issues, such as the needs of special populations, the definition of the workplace, and the provision of transportation facilities” (Novaco 2001, p. 15878). The central idea underlying these studies is behavioural adaptation (Novaco 2001). An increasing amount of research uses behavioural adaptation to initiate behaviour change toward more sustainable practices. These studies seek to identify and utilise psychological constructs that account for the

subjective evaluation of travel mode choices on the one hand and constructs that express preferences for different transport modes on the other (Hunecke et al. 2007; Steg & Tertoolen 1999). Studies by Cellina et al. (2019), Skarin, Olsson, Friman, and Wästlund (2019), Diniz et al. 2015, Olsson et al. (2018), and Olsson, Maier, and Friman (2019) are examples of the many innovative sustainable mobility projects, which have recently capitalised on changing normative and policy approaches that prioritise sustainable mobility solutions because of environmental concerns.

Despite promising developments in the field, there are two significant challenges undermining the contributions of sustainable mobility theory and interventions. The first relates to the limited scope of these approaches. As mentioned earlier, the biggest challenge most hard policy approaches encounter relates to the considerable financial costs and system change requirements that restricts the potential for introducing such initiatives. Soft approaches tend to be hampered by methodological reductionism. On the one hand, studies focus only on how people travel, while ignoring the myriad of reasons motivating people to travel in the first place (Cass & Faulconbridge 2016). On the other hand, soft policy initiatives often do not consider the impact of environmental constraints, such as the shortcomings in mobility infrastructure or other structural barriers that shape mobility practices (Bergman, Bergman, & Pirie 2014; Bergman & Bergman 2015; Geurs & van Wee 2004; Holden, Linnerud, & Banister 2013; Mokhtarian & Salomon 2001). Beyond the limitations inherent within each approach, possibly the greatest challenge results from the lack of cross-fertilisation between hard and soft approaches. This is because studies tend to focus on either technical and socio-structural or on psychosocial dimensions of mobility. Few studies have attempted to combine soft and hard approaches to greater sustainable mobility (Gehlert et al. 2013). Notable exceptions include Collins

and Chambers (2016), Hunecke et al. (2007), and van Wee, Holwerda, and van Baren (2002) who studied variations of psychological, sociodemographic, infrastructural, or situational effects in mobility behaviour; Poortinga, Steg, and Vlek (2016), who examined different psychological and environmental aspects of home and transport energy usage, and Steg, Bolderdijk, Keizer, and Perlaviciute (2014), who investigated pro-environmental behaviour in relation to intra-individual goals, values, and situational cues. Despite the heterogeneity of these studies, they arrived at a similar conclusion, that “[t]ravel behavior is jointly determined by individual factors, social influences, and the transport environment” (Gehlert et al. 2013, p. 22), and that “the most important task for mobility research is an integrated analysis of the infrastructural and personal determinants of mobility behaviour” (Hunecke et al. 2007, p. 278). Despite the growing consensus that mobility practices are nested within a complex and dynamic network of individual, social, regional, and environmental factors (Holden, Linnerud, & Banister 2013, 2017), an approach to conceptualise and empirically analyse these dynamics has not yet been developed. Consequently, “little is known about which kind of transport system would be sustainable and acceptable, and which criteria for sustainability should be used” (Steg & Gifford 2005, p. 59) to study sustainable mobility.

The second challenge relates to the difficulty of connecting sustainable mobility in its current form to different mobility contexts around the world. The green transportation hierarchy and related sustainable mobility definitions introduced at the beginning of this section are instructive in this regard. First, they tend to assume access to extensive public transport infrastructure such as trains or the availability of the financial resources to remodel existing infrastructure or to develop new, more sustainable systems. Second, they depend on cultural norms that place a premium on environmental protection, often at least

implicitly at the cost of economic and social development. This makes the aims of sustainable mobility difficult to reconcile in contexts which lack developed public transport infrastructure or the financial resources to make these investments at scale or in contexts where environmentally oriented cultural norms are not prioritised such as when economic and social developmental needs conflict with environmental protection.

The primary challenges in the field of sustainable mobility essentially concern the inability of theories and interventions to account for difference in terms of cultural practices, mobility needs, and varying mobility contexts, and for the interdependence between individual mobility practices and the specific environments within which these practices are situated. The overall purpose of this research is to use concepts and theories from psychology to overcome these challenges and thereby contribute to improving sustainable mobility solutions. This undertaking begins with exploring how differences can be conceptualised by turning to a field in psychology that specialises in studying, systematising, and empirically analysing cultural practices.

Cultural Psychology

“Cultural psychology aims to develop a principle of intentionality by which culturally constituted realities and reality-constituting psyches continually and continuously make each other up, perturbing and disturbing each other, interpenetrating each other’s identity, reciprocally conditioning each other’s existence.”

(Shweder 1995, p.71)

Cultural psychology provides a useful starting point to engage with the notions of sustainable mobility since, unlike much of the field’s occupation with discovering context-free, intra-individual psychological mechanisms, cultural psychology assumes and studies the relationship between individuals and their sociocultural contexts (Schweder 1995; see also Eom & Kim 2014; Fiske, Kitayama, Markus, & Nisbett 1998). Broadly, the field can be divided into three approaches, each with its own notion on how the interaction between individuals and culture function.

The first and most common approach focuses on the way culture impacts on and influences individuals. Here, studies examine shared values, practices, and behavioural norms to systematise the “fundamental influence of culture on how people think, feel, and behave, both within the mind and with other people” (Eom & Kim 2014, p. 331). Specifically, studies use value scales, questionnaires, and cognitive priming to examine the influence of social categories, such as nationality or regional affiliation, social class,

or religious affiliation on individuals (see for example Cohen 2009; Cohen, Nisbett, Bowdle, & Schwarz 1996; Heine et al. 2001; Kim 2002; Kitayama, Mesquita, & Karasawa 2006; Kraus, Piff, & Keltner 2011; Nisbett 1993; Snibbe & Markus 2005; Stephens, Markus, & Townsend 2007; Varnum, Na, Murata, & Kitayama 2012). A contemporary area of interest in this regard, and one I will return to in more detail later in this thesis, is the role of technological transformations in disrupting and transforming existing cultural practices by transmitting new cultural values to individuals (see for example, Bandura 2001; Christensen, Raynor, & McDonald 2015; Fukuyama 2000; and Sheller & Urry 2016).

The second approach emphasises the reverse interaction by focusing on how individuals influence culture. Here, individuals are considered the primary producers of cultural realities and cultural artefacts, such as paintings, drawings, pottery, children's books, school textbooks, websites, and advertisements. The construction of culture and artefacts are presented as social representations of values and norms (see for example Imada 2010; Kim & Markus 1999; Masuda, Gonzalez, Kwan, & Nisbett 2008; Sasaki, Kim, & Xu 2011; Tsai, Louie, Chen, & Uchida 2007; Wang, Masuda, Ito, & Rashid 2012; and see Morling & Lamoreaux 2008 for a meta-review). Comparing cultural products created in the "West" with those created in the "East" and Latin America, for example, Morling and Lamoreaux (2008) identified distinct cultural characteristics delineating strong individualistic traits such as independence, uniqueness, and exaggerated positive affect embedded in "Western" cultural products, versus a more collectivistic-orientation relating to interdependence and conformity in "Eastern" and Latin American products.

The third approach conceptualises the relationship between individuals and culture as reciprocal because individuals are both products as well as producers of culture (Fiske et al. 1998; see also Thomas & Znaniecki 1918; Bergman 1998). According to the approach of mutual constitution proposed by Kitayama, Markus, Matsumoto, and Norasakkunkit (1997) for example, individuals and culture engage continuously in processes of co-creation in specific cultural contexts. They argue that these encounters are mutually shaping. On the one hand, when individuals subscribe to shared cultural values, they collectively produce daily encounters that are consistent with their values. These daily encounters are concurrently experienced collectively and function to promote and maintain shared values on an intra-individual level. These mutually shaping encounters can be understood as unique, culturally constructed realities, which vary systematically between different cultures. Accordingly, empirical studies using this approach attempt to identify cultural threads that run through various aspects of psychological tendencies and sociocultural environments (Eom & Kim 2014; Hofstede 2001; Kim & Markus 1999; Sasaki, Kim, & Xu 2011; Snibbe & Markus 2005; Bergman 1998). A study by Kim and Markus (1999) for example, accounted for this interdependence by simultaneously applying the first two approaches in a multi-study research design and then connecting them with the same cultural ‘thread’. This enabled them to illustrate how core cultural values of uniqueness in American culture and conformity in East Asian cultures are evident in cultural products such as advertisements (i.e. individuals influencing culture) as well as in preference judgements and choices in social interactions (i.e. culture influencing individuals).

These approaches provide interesting frameworks to conceptualise how the dynamics between individuals and culture function in different environments and makes a

compelling argument for not only a more systematic integration of cultural dynamics into studies on sustainable mobility, but also that such an integration is possible. This means that it is, at least theoretically, possible to study different cultural dynamics in different contexts in a meaningful way, which connects well with the second challenge in the field of sustainable mobility: the need to account for the interdependence between individual mobility practices and the specific environments within which these practices are situated. However, studying mobility practices across different contexts requires a conceptual framework, which can account for various cultural, individual, and environmental dynamics. In the next section, the work of Albert Bandura, especially his concept of personal agency and his Model of Triadic Reciprocal Causation (2008, 2006, 2001, 1986) will be used to develop such a framework.

Personal agency and Albert Bandura's Model of Triadic Reciprocal Causation

According to Bandura (2001), individuals negotiate their way through a highly complex and constantly changing world by continuously adapting, developing, and renewing themselves. He termed this 'personal agency' and defined it as an individual's ability to "designedly conceive unique events and different novel courses of action and [choosing] to execute one of them" (Bandura 2001, p. 5). From an agentic perspective, individuals are not products of their lives or onlookers of their behaviour; rather they are intentional actors. To do so successfully, individuals must be able to effectively assess their own capabilities, anticipate and predict the effects and outcomes of situations and courses of

action, and assess the opportunities and constraints within their environment to make appropriate decisions and to adjust their behaviour accordingly (Bandura 2001). Facilitating this process, is the reciprocal interplay of self-efficacy, goals, desired outcomes, and environmental influences (Bandura 2006).

According to Social Cognitive Theory (SCT), there are four core properties of personal agency namely, intentionality, forethought, self-reactiveness, and self-reflectiveness (Bandura 2006). Intentionality refers to the strategies or action plans people formulate to bring about a desired outcome (Bandura 2006, 2001). These intentions form the basis of future actions (Bandura 2006, 2001). Intentions to achieve a desired outcome are motivated by forethought. Through the construction of goals, forethought can give direction and coherence by laying the foundation to act intentionally in the process of realising these goals (Bandura 2006, 2001). Agency consists not only of the ability to construct goals and intentions and formulate choices and action plans, but also of the ability to give shape to appropriate courses of action through self-reactiveness, or the ability to act (Bandura 2006, 2001). Finally, self-reflectiveness, or the ability to reflect on the adequacy of one's thoughts and actions, contributes to self-efficacy or the belief that a desired outcome can be achieved (Bandura 2006, 2001). These dimensions describe the intra-individual components of how agency unfolds. Given the limited capacity of individuals to exercise direct control over their environment, SCT furthermore conceptualises different modes of agency to illustrate how individuals can extend their agentic scope to enlist the help of others and to realise their goals.

Modes of agency

SCT distinguishes between three modes of agency, namely individual, proxy, and collective. Individual agency concerns the personal influence that people use to guide their own functioning and their immediate environment. Here ‘I’ am the agent who acts to achieve my goals. Proxy or socially-mediated agency relates to an individual’s ability to influence an institution or networks of people to act on their behalf, and to help them secure their desired outcomes. This could be a parent, an employer, or a city or government official – essentially anyone with access to more resources that could be utilised to help and individual achieve their goal. Collective agency refers to achieving desired outcomes through interdependent effort (Bandura 2008), which in this case denotes people working together to achieve a shared goal. Bandura states that even though the distinct blend of these modes of agency varies cross-culturally; all individuals rely on all three to conduct their daily lives. These modes, combined with the core properties of personal agency, form the basis from which SCT accounts for individual agentive practice.

Triadic Reciprocal Causation

To explain how agency works, SCT uses the Model of Triadic Reciprocal Causation (Bandura, 1986). In this model, “internal personal factors in the form of cognitive, affective, and biological events, behavioral patterns, and environmental influences all operate as interacting determinants that influence one another bidirectionally” (Bandura 2001, pp. 14-15). Within the Model of Triadic Reciprocal Causation, three types of environment are distinguished: a selected environment, a constructed environment, and

an imposed environment (Bandura 2006). All three “represent gradations of changeability” and require different foci and modes of agency (Bandura 2006). Although theoretically the most underrepresented concept of SCT, it is based on the idea that people are agents of their environments since “[t]hey create it, preserve it, transform it, and even destroy it, rather than merely react to it as a given” (Bandura 2006, p. 167). Of importance here is not only that individual agency is a socially mediated interplay between individual actions and different environments, but that these environmental determinants are influenced and exercised through various psychological mechanisms. Whether we are referring to goals or expected outcomes, intentions, or actions, whether we refer to individual, collective, or proxy agency, or whether we refer to the effects of various environmental determinants; all are relayed through the intermediating psychological process of personal agency. Thus, SCT accounts for various internal processes, modes of action, and external influences by explaining how individuals reflect upon, construct, and integrate these psychosocial and socio-structural environmental dimensions into the process of exercising personal agency.

Figure 3 synthesises the components of SCT discussed thus far into a unified and simplified model. The starting point and central actor through which agency is mediated is the individual. From here, agency is laid out chronologically as the action to attain a desired outcome. Based on intentions to achieve this desired outcome, individuals choose between three modes of agency and initiate the action, which is most likely to achieve their desired outcome or goal. This process is moderated by various environmental determinants, which serve to facilitate or constrain this action potential.

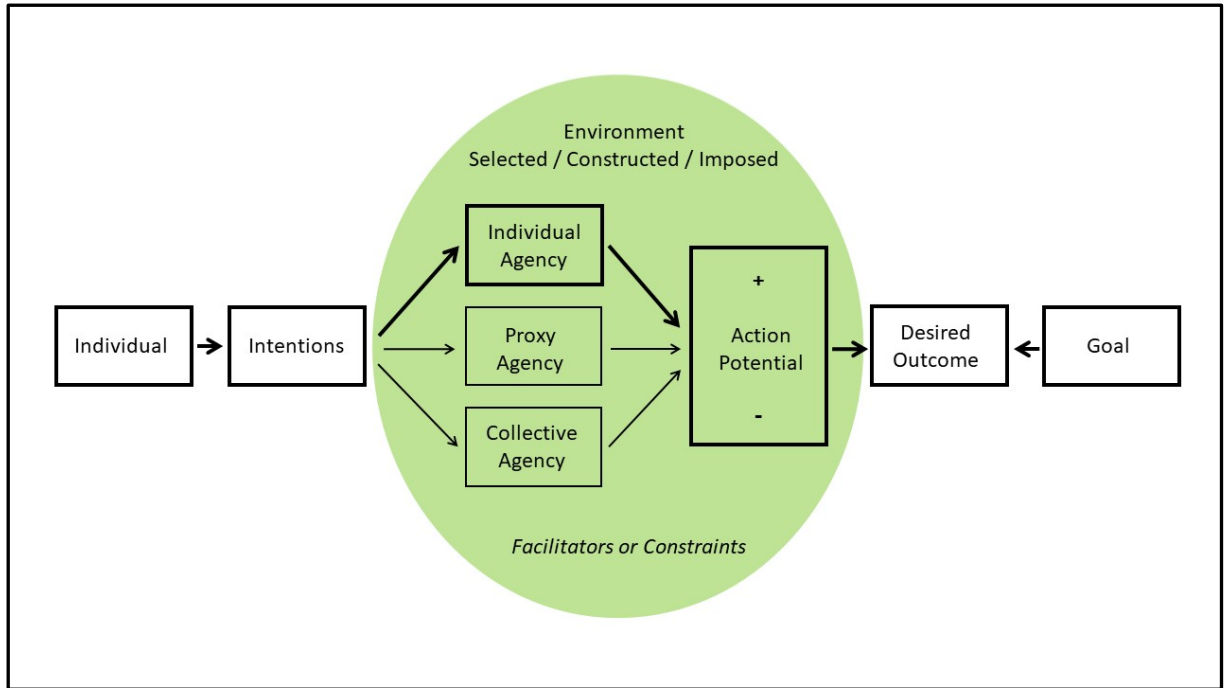


Figure 3. Bandura's (2001) conceptualisation of personal agency.

From Bandura's detailed articulation of how different components interrelate to form agentic pathways, we know that this linear representation of agency does not fully capture its complex feedback loops. No theoretical or empirical model can accomplish this. However, it serves as a suitable conceptualisation of the different components of SCT within a broader framework. The aim of this more general framework is to, first, illustrate the different dimensions of SCT and second, to show how this conceptual framework may be extended to examine personal agency as connected to sustainable mobility practices.

Despite, or possibly because of, its theoretical ambitions, the Model of Triadic Reciprocal Causation has rarely been studied empirically. Some notable exceptions have loosely applied the idea of reciprocal causation to conceptualise reciprocal dynamics between

personality traits of students, perceptions of interpersonal behaviour of teachers, and academic achievement (Charalampous & Kokkinos 2014). Other applications have examined the relationship between information technology investment and organisational performance in the context of Enterprise Resource Planning (Bin, Chu-hing, Qiong-yu, & Zhen-peng 2010), or health and safety performance in organisational practice via a reciprocal model of safety culture (Cooper 2000). Finally, Schiavo, Prinari, Saito, Shoji, and Benight (2019) have recently developed a mathematical equation to model the equilibria of a system, which they proposed could be used to understand how people adapt to traumatic events or significant daily stressors. Although these studies were limited to a selective adaptation of Bandura's concept of reciprocity to specific research foci, they all concluded that a dynamic exchange between different interpersonal, psychosocial, and environmental factors could be identified.

Despite the potential of the Model of Triadic Reciprocal Causation to account for complex human interactions, it has received little empirical attention due in part to the ambiguity of the concepts and the variability of their relations. To some extent, this was intentional, since Bandura argued that these dimensions and their relations would vary according to context, culture, and behavioural predispositions (Bandura 2006). However, as some scholars have pointed out, the relative looseness of the concepts and their interdependence (Tschannen-Moran & Hoy 2001; Garvis & Pendergast 2016) as well as the conceptual overlap between expectations and outcomes limits the applicability of the theory (Eastman & Marzillier 1984). Interestingly, even studies focusing on different types of agency are rare. More common are theoretical contributions written by Bandura himself (see Bandura 2000a, 2000b, 2002, 2018) or overview chapters that explore the role of different types of agency in relation to concepts and theories on, for example, life course

trajectories and adolescence (Levesque 2011), motivation and behaviour, (Hutchison 2008; Petri & Govern 2012), cooperation and competition (Johnson & Johnson 2015), or collective identity (Snow & Corrigan-Brown 2015). Empirical studies with this focus include, for example, Hoy and Di Paolola (2007) who studied the effect of collective teacher efficacy on student performance and Hipp (2016) who studied collective efficacy in relation to perceived neighbourhood crime and disorder. Instead, the vast majority of research using SCT have focused on individual agency (indicated by the BOLD boxes in Figure 3) and the self-efficacy model of behaviour change, such as in the fields of health (for example, Bandura, 1997; Langlois, Petorsa, & Hallam 1999; Tougas, Hayden, McGrath, Huguet, & Rozario 2015), education (Bandura 2004a; Bores-Rangel, Church, Szendre, & Reeves 1990; Chapman-Novakofski & Karduck 2005; Church, Teresa, Rosebrook, & Szendre 1992; Hackett & Byars 1996; Ryerson 1994; Rogers et al. 1999), and media studies (Gibson 2004; Hill, Song, & West 2009). While these studies are suitable to predict human behaviour and guide effective interventions, this selective focus has resulted in a misrepresentation of theory and research on personal agency since “cognitive processes are generally studied disembodied from interpersonal life, purposeful pursuits, and self-reflectiveness” (Bandura 2001, p. 5). The consequences of this one-sided application represent the most compelling critique against studies on personal agency (Carillo 2010) – a critique this research attempts to address.

Bandura often argued against the methodological reductionism that “pits psychological theories and sociostructural theories as rival conceptions of human behavior or as representing different levels and temporal proximity of causation” (Bandura 2006, p. 167; see also Bandura, 1997, 2001, 2004a, 2004b). According to him, the agency-socio-structural dualism found in divisions such as personal agency versus social structure,

person-oriented agency versus communality, and individualism versus collectivism, detracts from richer contributions that a combination of the approaches could make. He rejected such divisions and argued instead for conceptualising agency as multidimensional and embedded in the understanding that people function within complex socio-structural systems and that this exchange is dynamic and interdependent (Bandura 2001, 2006). Accordingly, this research aims to expand the conventional, unidirectional application of SCT by exploring the multidimensional nature of personal agency as initially formulated by Bandura in the Model of Triadic Reciprocal Causation.

Mobility as agency

Extending the conceptual model of agentic practice outlined in Figure 3 to mobility practices and notions of sustainability is the next logical step. The ability to be mobile serves as one of the primary functions through which individuals realise their personal, professional, and social goals, and our potential as agents is deeply connected to our ability to be mobile. By outlining different modes of agency as well as the potential of different types of environments (selected, imposed, or constructed) to facilitate or constrain agentic action, this framework helps to conceptualise the interdependence between different psychosocial and socio-structural environments that define mobility practices. The variability of options and conditions embedded within the framework allows agentic pathways to be structured not in a fixed, predictable pattern, but rather as based on the unique reciprocal interactions within which mobility practices take place (Bandura 2006).

As an example, consider this personal account. On most mornings my mobility goal is to go to work. This translates into my intention of going from home to my workplace. I have at my disposal multiple mobility options to turn my intentions into my goal. I could drive with my car, I could take my bicycle, or I could use public transport, a combination of bus and tram. Given that I work in the centre of the city, parking is limited and prohibitively expensive. This is an example of an environmental constraint that makes it less likely for me to choose driving my car as an option. For sustainability reasons, I also try to limit my carbon footprint, which means I actively try to avoid using my car. This is an example of an intra-individual disposition, which influences my mobility choices. I check the weather and realise that although the weather looks fine this morning, it will be raining by the time I leave work. This is an example of a facilitating environment since my access to weather reports, enables me to adjust for some of the variability in my environment. Not wanting to ride my bicycle in the rain, I decide to take public transport. Accordingly, I choose the option which best facilitates my action potential to reach my goal of going to work.

There exists a variety of other instances when the mobility goal of going to work is not so easily attained. In many cities and regions around the world, for example, public transport is not available and therefore the mobility environment imposed on people make this unviable. An example of proxy agency in this regard, for example, relates to people campaigning to their local or national government to act on their behalf to make this option available to them. Perhaps their car needs repairs, is undergoing a service, or, due to financial constraints they would prefer not to use it. In this instance, they might arrange a car sharing initiative with colleagues and by pooling their resources, they achieve their

shared mobility goal through interdependent effort. This is an example of collective agency. Finally, a person may not own a car and live far from their place of employment. Perhaps they have access to a public train service, which is burdened by delays, cancellations, or other disruptions. If they are unable to overcome such difficulties, their constrained mobility environment could place their employment at risk.

The examples above are based on a single mobility goal – to go to work. In reality, people pursue many types of mobility goals every day. It also highlights only some of the options and conditions that influence mobility choices. Accordingly, the framework of mobility as agency lends itself to studying mobility as a dynamic, reciprocal, agentic practice embedded within different sociocultural environments.

Research focus and study context

The overall purpose of this research is to explore the contribution the field of psychology can make to conceptualising and developing sustainable mobility from a cultural psychology perspective that transcends the limitations of current approaches in sustainable mobility as highlighted earlier. These limitations relate, on the one hand, to the difficulty in connecting sustainable mobility ideals to different and diverse cultural contexts and, on the other hand, to account for and integrate the interdependence between psychosocial individual dimensions and sociocultural and technological environmental dimensions into a single framework.

To overcome the reductionism of current approaches that limit sustainable mobility theory and interventions to either hard or soft approaches, the work of Albert Bandura's concept of personal agency as embedded in his Model of Triadic Reciprocal Causation is used. Combining these dimensions into a conceptual framework is based on the preposition that mobility practices, while essentially practiced by individuals, constitute a dynamic interplay between several dimensions. These include intra-individual and psychosocial dimensions, such as people's mobility goals, desired outcomes, and mobility intentions, the plans they formulate to put these into practice, as well as the various modes of agency available to them (individual, proxy, or collective). It also includes various environmental factors that are either selected, constructed, or imposed. All these dimensions interrelate in unique and complex ways according to culture and context to create a facilitating or constrained action potential, based on which a person is able to secure their mobility goals, or leave their mobility desires unattained. This dynamic process is termed 'mobility as agency' and the next steps consist of an empirical application of this conceptual framework to examine the extent to which mobility as agency (a) connects to the mobility practices of individuals, and (b) capture the reciprocal interplay between psychosocial and sociocultural and technological environmental dimensions.

Beyond this, another concern relates to the difficulty of connecting sustainable mobility theories and models to different contexts. This is because sustainable mobility in its current form depends on the presence of specific cultural norms, which are not necessarily present in mobility contexts around the world, as argued in relation to the green transportation hierarchy earlier. This puts into question the extent to which contemporary concepts of sustainable mobility can be fruitfully connected to varying mobility contexts.

Of specific interest is developing a more grounded understanding of how sustainable mobility would need to be adapted to differing contexts and cultural spaces. Based on the theoretical underpinnings of the field of cultural psychology, we know that culture and mobility are deeply intertwined. Regardless of the nature of this relationship, mobility landscapes determine the cultural space of individuals through collective experiences and shared values, whether individuals bend mobility landscapes to align with their own values, or whether mobility practices are reciprocal and mutually shaping. Studying specific mobility contexts ought to enable the identification of cultural threads that define particular contexts and that also vary systematically between different contexts. Studying different mobility contexts will then enable the examination of: (a) the extent to which contemporary concepts in sustainable mobility connect to different mobility contexts and (b) what sustainable mobility looks like (or ought to look like) in different mobility landscapes. The rationale to exploring the contribution cultural psychology can make to developing sustainable mobility solutions translates into the following research questions:

- (1) Can mobility as agency as outlined in Albert Bandura's Model of Triadic Reciprocal Causation be empirically identified in the mobility practices of individuals?
- (2) How do these dimensions of mobility as agency interrelate?
- (3) What are the implications of conceptualising agency according to the understanding of sustainable mobility in different cultural contexts?

To answer these research questions, the concepts and theoretical models discussed thus far must first be translated into an empirical framework. This is outlined below.

Methods

This thesis presents four studies conducted in three research sites in the United States (US), China, and South Africa. The first study, presented in Chapter Two, connects the main problems associated with sustainable mobility to the mobility practices of Metrorail commuters in the Western Cape. This enables a systematic analysis of the gap between sustainable mobility in theory and practice, based on the experiences of commuters. These insights are used to draw relevant concepts from the field of psychology that could help address these challenges. Specifically, Bandura's concept of personal agency and his Model of Triadic Reciprocal Causation are used to develop mobility as agency, a framework that accounts for mobility practices as consisting of interdependent and dynamic intra- and inter-personal, psychosocial, and socio-structural and technological environmental dimensions. Then, a comparative case study design is employed to examine mobility as agency according to different cultural and contextual dynamics in the US (Chapter Three), China (Chapter Four), and South Africa (Chapter Five).

The comparative case study approach used in this research is an adaptation of the key components proposed by Bartlett and Vavrus (2017). Specific prepositions relate to heuristics, comparative logic, the role of context and culture, and the flexibility of research design. First, Bartlett and Vavrus (2017, p. 6) propose to use case studies as a heuristic framework to conduct exploratory research that aids "in the process of discovery or problem-solving". This aligns well with the main research interests, which attempt to uncover ways to address the current challenges in sustainable mobility. Second, the authors assert that an exploratory comparative case study does not necessarily follow a

traditional case study approach aligned with a so-called positivist logic, which treats cases as static and bounded instances in which specific units of analysis can be selected and held constant, while others are varied in order to test hypotheses (Bartlett & Vavrus 2017; Babbie 2012; Guba & Lincoln 1994). Instead, Bartlett and Vavrus (2017) suggest using a case study design that mimics multi-site ethnographical studies to trace how processes unfold across multiple sites. Significant here is not an attempt to hold variables constant or to identify sites based on similarity, but rather to anchor the multi-site case study design based on tracing a specific phenomenon of interest within and across research sites, regardless of how similar or dissimilar they are. The phenomenon the current research seeks to trace across various sites relates to mobility desires, expectations, and practices within the framework of mobility as agency. Two additional components relate to how context and culture could be integrated into a comparative case study design. As traditional case study designs rely on cases as static, bounded units of analysis, context is similarly treated as a material place or space divorced from the social, historical, and political dimensions, which continuously define it. But as Bartlett and Vavrus (2017, p. 12) point out, “context is not a container for activity; it *is* the activity”. Consequently, context is defined as spatially and relationally informed. It constitutes social activities and interactions (Bartlett & Vavrus 2017). This makes the connection to culture obvious. According to Bartlett and Vavrus (2017), culture is an ongoing process of production that is traceable through social activities and interactions. This complements the theoretical propositions put forward by researchers such as Kitayama et al. (1997) to describe the mutual shaping of interpersonal encounters. In this way, the comparative case study approach proposed by Bartlett and Vavrus (2017) aligns well with the theoretical underpinnings of the role of context and culture as discussed on multiple theoretical levels in this thesis. The partition of context and culture into distinct concepts assists in parsing

out different dimensions of mobility practices. The interdependence between culture and context, furthermore, embeds into the research design the core assumptions of mobility as agency: that mobility practices are inherently complex, multidimensional, interdependent, and, indeed, influenced by culture and context. Finally, while Bartlett and Vavrus (2017, p. 10) make numerous suggestions of how comparative case studies could be designed, they also acknowledge that specific study designs are inherently flexible and dependent on “the study’s aims, the researcher’s motivations, skills, interests, and the available time and resources, among other things”. This flexibility is something my colleagues and I have echoed in our own research methods publications, and the research methods used in this study, such as Content Configuration Analysis (CCA) and Hermeneutic Content Analysis (HCA) are firmly embedded in this logic.

Accordingly, this research uses a comparative case study design, which “reconsiders key notions of culture, context, place, space, and comparison, and contrast” (Bartlett & Vavrus 2017, p. 14) in a way that conceptualises context as spatial and relational and culture as processual and continuously constructed. Specifically, the dimensions of personal agency as proposed by Albert Bandura are used to explore the complex interactions between agency and environment dimensions according to the Model of Triadic Reciprocal Causation in three research sites in the US, China, and South Africa. In the following section, the main characteristics of each research site and research questions are outlined. This is followed by a detailed discussion on sampling, data collection, data analysis, and ethical considerations and the chapter ends with a short description of the role and responsibilities of the author of this thesis, as well as an outline of the remaining chapters.

Case selection

To examine the interdependent and reciprocal nature of mobility practices in different contexts, mobility as agency is studied in three research sites in the US, China, and South Africa. These three research sites are purposively selected based on their significantly different mobility environments, cultural orientations, and economic and political ideologies. In this regard, selecting sites in the US and China are obvious, contrasting choices, while the research site in South Africa provides interesting overlaps as well as divergences.

As the world wealthiest country, the US is generally considered as a highly developed economy with a strong commitment to federalism, democracy, and market capitalism (Weingast 1995). It is also known for its hyper-individualistic tradition, which reflects in its mobility landscape defined by private vehicle use and a general lack of well-developed public transport infrastructure, especially passenger trains (Banister, Pucher, Lee-Gosselin, Rietveld, & Stough 2007; Steg 2005; Urry 1999, 2004). By contrast, China sets itself apart in terms of developing its own economic and political trajectory. The centrally controlled communist regime in China pursues its own variant of capitalism with socialist characteristics, which is embedded in strong collectivistic and Confucian traditions (Bell 2008; Bergman, Bergman, Liu, & Zhang 2015; Zhao 1998; Zhao 2005). In terms of the mobility landscape, it is home to one of the best and most advanced rail systems in the world (Bergman, Bergman, Haenggi, Zhao, & Thatcher 2020; Yang, Dobruszkes, Wang, Dijst, & Witte 2018). What China has in common with South Africa is its economic classification; both are considered middle income countries with large and increasing

inequality structures (Arnal & Förster 2010). Currently, Chinese and South Africans earn just over one-tenth of what US Americans earn (World Data 2020). South Africa provides interesting overlaps with and contrasts to the other study sites. Politically and economically, South Africa shares with the US a commitment to democracy and capitalism; however, it is largely viewed as an emerging economy (Resnick 2015). In terms of cultural orientation, South Africa offers an interesting third position since its multicultural backdrop shares characteristics with both individualistic and collectivistic orientations – without belonging clearly to one or the other (Eaton & Louw 2000). Finally, the nation-wide passenger rail system, Metrorail, and the extensive road infrastructure in the Western Cape, which caters to private car users, shares similarities in the mobility domain with the other two contexts.

In other words, there are interesting and complex cultural similarities and differences within and between these national contexts. That these research sites have such different mobility environments, cultural dynamics, and economic and political trajectories reflect the diverse, historically-grown, culturally-determined, and contextually-driven dynamics that shape mobility environments around the world. As exemplars, these three sites provide the opportunity to study how mobility as agency changes and adapts to such complex variations and to see how sustainable mobility from an agency perspective is dealt with. Obviously, these differences also create the conditions to apply a qualitative and ethnography-inspired case study method as discussed above.

Research site A: Car users in regions without developed passenger rail infrastructure in the US

There are many reasons why parts of the US could be considered incompatible with the aims of sustainable mobility. Perhaps the most striking of these is the predominance of the car, which is profoundly embedded in the cultural identity of the country and the personal identity of the individual. Urry (1999, 2000, 2004) termed this ‘automobility’, the association of freedom, convenience, pleasure, and status associated with private vehicle use and ownership (Banister et al. 2007; Jakobsson 2007; Mokhtarian & Salomon 2001; Steg 2005; Westman, Friman, & Olsson 2017). Despite a growing debate on sustainability and sustainable mobility, decades of automobility have shaped the values, policies, institutions, and infrastructures nationwide. Accordingly, a study on sustainable mobility makes the US an interesting study context to examine mobility desires, expectations, and practices. Of course, every national context is heterogeneous in many ways, including mobility practices. Although the US is generally known for its lack of public transport infrastructure, there are notable exceptions, such as the BART system in San Francisco or Amtrak serving the East Coast corridor from Washington to Boston via New York. This is, furthermore, consistent with the widely accepted stereotypes of the ‘blue’ coastal cities, which tend to acknowledge the importance of sustainability and the conservative, ‘red’ interior, often connected to climate change-denial (Collomb 2014; Funk & Hefferon 2019). While these assumptions often hold true, using such general labels and cognitive shortcuts to classify US Americans would not do justice to the variability and complexity of opinions, attitudes, norms, and values dispersed throughout the country. This research attempts to stay clear of such general labels.

Given that it would not be realistic to study the US as a whole (or China or South Africa), especially because culture and context vary across regions, the research focus is limited to a specific phenomenon – to examine the potential of sustainable mobility in contexts where cars are the predominant mobility mode. Therefore, US regions that do not have a well-developed passenger rail infrastructure are selected as study sites, i.e. interviews were conducted in the Midwest, South, and Southwest of the US. The considerable mobility of residents of these regions does not allow for a focus on one region or state, for example, because, with the exception of isolated regions, most residents of a state have studied, worked, and lived in others. Thus, while this study is not representative of a group, region, state, or mobility practice cluster, it nevertheless reflects the mobility experiences and practices of residents in regions without developed passenger rail infrastructure. In this context, three research questions guide the inquiry:

- (1) Are the agency and environment dimensions as outlined in Bandura's Triadic Reciprocal Causation model present in the narratives of car users in the US?
- (2) How do these dimensions interrelate with the reported mobility practices?
- (3) How do trains specifically and sustainable mobility more generally, relate to their mobility choices?

Research site B: Train users in Beijing, China

Since introducing systematic reforms to open up its economy, China has undergone several large-scale transformations that have brought to its citizens many far-reaching

social, economic, and health benefits. A cornerstone of this development has been the introduction of China's mobility turn. This entailed modernising and expanding its 150-year-old rail system. Now, China is home to a rail system that encompasses more than 127 000 km (NBS 2019), with an additional 31 000 km high-speed rail (HSR) that travels between 250 and 350 km/h (UIC 2019). Not only is this the largest and most advanced rail system in the world, but it is largely considered to be efficient, safe, and environmentally friendly (Aglietta & Bai 2016; Bräutigam & Tang 2014). It is also one of China's most important export and development cooperation projects (Aglietta & Guo 2016; Bräutigam & Tang 2014; Bergman et al. 2020; PRC 2016). This rapid, technological transformation has profoundly altered life in Beijing, and in this study, mobility as agency is used to study the mobility practices of regular train users in Beijing to understand what this means to them. Specifically, the research questions framing this study are:

- (1) Are the agency and environment dimensions as outlined in Bandura's Triadic Reciprocal Causation model present in the narratives of train users living in Beijing?
- (2) How do these dimensions interrelate with the reported mobility practices?
- (3) How do these dimensions and interrelations connect to China's sociocultural model?

Research site C: Metrorail commuters in the Western Cape, South Africa

The mobility landscape of the Western Cape shares many similarities with the research sites in the US and China. As with the former, there is a strong infrastructure, socioeconomic commitment, and symbolic attachment to private car use and ownership. Akin to China, South Africa is, at least in principle, committed to addressing economic and social development, and, similar to the Chinese research site, the Western Cape is home to a developed public transport system, Metrorail and the MyCiti bus system. In the Western Cape, Metrorail maintains 119 stations and 610 km of tracks across four lines – a Northern Line, Southern Line, Cape Flats Line, and Central Line that connects various parts of the city with each another (Bergman, Bergman, & Thatcher 2019).

Beyond some similarities, the mobility landscape of the Western Cape diverges significantly from the other research sites. The Metrorail system, often described as old, dilapidated, and unsafe, creates a precarious and unreliable mobility environment for commuters in which they encounter delays, cancelations, breakdowns, inadequate, broken, or destroyed infrastructure on trains and at train stations, limited support from train staff, as well as significant risks to personal and property safety (for a detailed discussion see, Bergman et al. 2014; Bergman & Bergman 2015; Bergman & Bergman 2019; Bergman, Bergman, & Thatcher 2019). The mobility encounters of Metrorail commuters are consistent with the characteristics defining the most difficult mobility landscapes around the world – inefficient and insufficient access to mobility embedded in a highly stratified and unequal society characterised by poverty, exclusion, and marginalisation. Given these systemic problems, it is in many ways the antithesis of

mobility. Yet, Metrorail commuters are highly mobile, which makes this an interesting research site. Metrorail in the Western Cape is used to conduct two studies. First, this failing mobility environment serves as a way to examine the extent to which theoretical concepts and models relating to sustainable mobility connect to real-world mobility contexts removed from regions where such theories are devised. This study, presented in Chapter Two, is guided by three research questions:

- (1) What are the options and conditions of mobility access as reported by Metrorail commuters?
- (2) How do options and conditions shape commuters' potential to be mobile not only in relation to Metrorail, but also to the greater mobility context of the Western Cape region?
- (3) How do the perspectives of Metrorail commuters on mobility in general, and trains in particular, connect to notions of sustainable mobility?

In the second study of Metrorail commuters in the Western Cape, presented in Chapter Five, mobility as agency is used to study how these commuters manage their mobility, despite the many challenges they encounter. Specifically, in Bergman, Bergman, and Thatcher (2019) the research questions are:

- (1) Can the agency and environment dimensions outlined in Bandura's Model of Triadic Reciprocal Causation be empirically identified in the narratives of Metrorail commuters?
- (2) How do the dimensions of agency and environment interrelate in the reported mobility practices of Metrorail commuters?

- (3) What are the implications of conceptualising agency accordingly on the understanding of sustainable mobility systems for Metrorail commuters?

The findings from these four studies are used to address the final research question, which seeks to understand what the implications of conceptualising agency in these different contexts are in relation to sustainable mobility. This will be explored in the final discussion section in Chapter Six.

Sampling

This research is based on non-representative studies, which examine the mobility practices of individuals in three research sites in the US, China, and South Africa. Given the specific focus, a purposive sampling design was used. Purposive sampling is a non-probabilistic sampling technique used in both quantitative and qualitative research that is suitable to study phenomena in specific cultural or societal settings. While the non-probabilistic nature of the sample as well as the sample size of each study means that the findings are not generalisable, the findings from these studies nevertheless reflect many of the dimensions found within the larger population since participants themselves are members of the population (Bergman 2018). In terms of the adequacy of the sample size, Creswell (2003) noted that 20-30 interviews are adequate for a qualitative analysis and the number of interviews in each study presented in this thesis is larger than this. Furthermore, this sample was large enough to generate an adequate sample size for the quantitative dimensional analyses, which were conducted (see below for more details; de

Winter, Dodou, Wieringa 2009). Below the sampling criteria for each research site is briefly outlined.

In Bergman (2019), the focus was on understanding how the mobility practices of individuals in the US research site connect to sustainable mobility more generally and trains specifically. The focus was therefore on geographical locations where there were no commuter trains (Indiana and Michigan in the Midwest, Nevada and Arizona in the Southwest, and Arkansas, Alabama, and Texas in the South). Participant selection was based on mobility type and frequency of use. In the US, participants were mostly non-users of trains yet highly mobile. All owned or had immediate access to private cars. For this study, a non-representative sample was selected to examine the variations and complex interplay between agency and environment dimensions according to the Model of Triadic Reciprocal Causation. Interviewees, 32 men ($n=15$) and women ($n=17$), ranged in age from 19 to 78 years ($\bar{x}=38$ years; $SD=19$) and came from diverse socioeconomic backgrounds. Three were professional athletes, one a full-time homemaker, and others worked in administration, arts, construction, education, the food and beverage sectors, IT, military or security, public relations, and tourism and hospitality. The sample furthermore included students, retirees, and unemployed individuals. All were US citizens.

In Bergman et al. (2020) the focus shifted to regular train users in Beijing. Given the high levels of mobility among Chinese citizens, an additional selection criterion – that participants were long-term residents of Beijing, guided the selection. Consequently, the selection criteria for this study included geographical location (minimum of 5 years residence in Beijing), mobility type (trains), and frequency (regular users). The interviewed men ($n=15$) and women ($n=16$) ranged in age from 18 to 61 years ($\bar{x}=36$

years; SD=13), represent a variety of occupational strata (unemployed, students, teachers, restaurant waiters, shop attendants, cleaners, janitors, bus drivers, graphic designers, software developers, mechanics, cooks, economists, and bureaucrats). As with the US research site, the data were not representative of a research population. Given that the goal of this study was to explore the complex interactions between agency and environment dimensions according to the Model of Triadic Reciprocal Causation in a commuter context, diversity was more important than representativeness.

To study train mobility in South Africa (Bergman & Bergman 2019; Bergman, Bergman, & Thatcher 2019), the studies focused on train users in the Western Cape. Specifically, 38 Metrorail commuters in the Cape Town and Stellenbosch region were interviewed in two waves of data collection. In the first wave, 31 interviews were conducted and used in the first study on how the mobility practices of Metrorail commuters in the Western Cape connect to concepts and theories on sustainable mobility presented in Chapter Two. Seven more interviews were conducted during a second site visit. In total, 38 interviews were used for the second study on mobility as agency of Metrorail commuters in the Western Cape presented in Chapter Five. Two selection criteria guided this process, namely mobility type and frequency of use. Consequently, all selected participants were Metrorail commuters who commuted daily in the two years prior to data collection. The interviewed men (n=19) and women (n=19) ranged in age from 18 to 78 years ($\bar{x}$ =34 years; SD=14), and were multi-ethnic (black, Asian, white, and coloured – a term used in South Africa, to denote people from a mixed race background that should not be confused with its pejorative use in other English-speaking countries), multi-lingual (speaking predominantly English, Afrikaans, isiXhosa, Tswana, Sesotho, and isiZulu), and pursued a variety of occupations (students, teachers, security guards, shop attendants, cleaners,

drivers, administrators, couriers, repair men and women, managers, occupational therapists, personal assistants, business owners, and the unemployed). While the data is not representative of the research population, the goal of this study was to explore the complex interaction between agency and environment according to the Model of Triadic Reciprocal Causation in the specific commuter context of the Western Cape. Therefore, diversity within the selection criteria was intentional and viewed as more important than representativeness.

Data collection process and instrument

In South Africa and China, participants were recruited in and near train stations, and depending on availability, interviews were conducted immediately or at an arranged time in close proximity to the station (at nearby benches, parks, or cafes) or at a venue negotiated with the interviewee. In the US, participants were recruited through haphazard sampling, based on spontaneous meetings, introductions, or referrals. Interviews were conducted immediately or at a time and place agreed upon with the interviewee. In Cape Town and Stellenbosch, interviews were conducted in Afrikaans and English, in Beijing in Mandarin and English, and in the US in English. The interviews averaged approximately 40 minutes. With the permission of the respondents, the interviews were recorded, transcribed, and anonymised for analysis. When interviews were not conducted in English, they were translated into English for analysis.

The interview schedule was developed and refined during an initial pilot phase, and re-piloted with members from the research population of each research site before data

collection commenced to ensure that language use was appropriate for the target group, that the terminology was understandable, and that the order of questions was adequate. The interview schedule for these interviews was specifically designed to flow from open-ended, exploratory questions to more thematically-oriented, semi-structured questions. The use of open-ended, exploratory questions at the beginning of the interview schedule aimed to elicit extended narrative responses from interviewees regarding their mobility expectations and experiences. This interview technique is best suited to collect in-depth responses and included questions, such as ‘Tell me everything that comes to mind when you think about trains?’. These were followed by semi-structured questions aimed to prompt specific mobility preferences or to examine mobility dimensions in detail, such as ‘When, where, and how often do you take trains?’ or ‘What do you think will happen with trains in the future?’. The purpose of these questions were to elicit narratives around mobility that outlined the different dimensions associated with the mobility practices of participants. These narratives were used to first, identify the various elements associated with mobility as agency as proposed by Bandura (research question 1) and then, to examine how these dimensions interrelate (research question 2). By exploring participant perspectives on, for example, what they think will happen with trains in the future or the tips they would give to decision makers aided in delineating a culturally-oriented understanding of what sustainable mobility means to them. This provided the foundation for making a comparison of how understanding of sustainable mobility may vary between different cultural contexts (research question 3).

This interview schedule has been successfully piloted and used to conduct similar research in France (Faure 2014), the United States (Batteau 2015; Batteau, Gamst, Zielinski, Anand, & Roti 2015; Batteau, Zielinski, Anand, Roti, & Treatl 2015), and

Singapore (Bergman & Bergman 2014). The interview schedule was piloted in the South African and Chinese contexts prior to data collection. See Appendix 1 for the interview schedules in English, Afrikaans, and Mandarin.

Data Analyses

While the data from the three research sites served primarily to study mobility as agency in different study contexts, a sub-set of the Metrorail data (n=31) was used to conduct an additional qualitative analysis using Content Configuration Analysis (CCA; Bergman 2011; Bergman & Bergman 2011). CCA belongs to the same family as content and thematic analyses, and it can be adapted to study all non-numeric data, which includes visual and audio data (Bergman & Bergman 2011). Bergman and Bergman (2011) described the 10 characteristics, which define CCA. First, “CCA explicitly and continuously relates context to the analytic process in relation to either the historical, political, cultural and social conditions of both the research context and data production, or the interconnectedness of data elements within the body of text” (Bergman & Bergman 2011, p. 39). For this research, this entailed interpreting the data in light of the specific technical and socio-structural environmental contexts of the different research sites in China, South Africa, and the US, as well as continuously aligning the analysis with the other text elements in the data. This, for example, led to a particular focus on ‘automobility’ (Urry 1999, 2004) in the US research site and a focus on the impact of technological change on the sociocultural model in the Chinese research site. Even though these elements are accounted for in the different studies, this is based on the recognition that all research is partial and conditional, and bounded by a particular time and zeitgeist. Second, CCA “is embedded in modern ontological and epistemological considerations,

while concurrently emphasising its practicability within empirical research” (Bergman & Bergman 2011, p. 39). This means that different ontological and epistemological positions are accommodated to the extent that they align with the focus of the research (Bergman & Bergman 2011, see also Bergman et al. 2010). In this research, for example, an ontological and epistemological position associated with a constructivist and material-realist approach is used to emphasise, on the one hand, the subjective meaning constructions and interpretations embedded in the perspectives of the interviewees who participated (a constructivist position) in relation to specific real-world technical and socio-structural environments on the other hand (a material-realist position). Third, if the goal of qualitative research is considered on a continuum wherein the identification of the actual content in the data occupies one end and “an analysis that aims to construct the meaning of a text based on the subjectivities of individual researchers on the other, then CCA occupies the space where these two positions overlap” (Bergman & Bergman 2011, p. 39). This means, for example, that ‘mobility as agency’ does not occur naturally as a concept in the narratives of interviewees, and that the agentic pathways interviewees use in their daily mobility encounters do not originate in the mind of the researcher. Rather, mobility as agency and the agentic pathways associated with mobility practices presented in this thesis emerge based on a systematic and scientific iteration between “inductive and deductive analytic approaches, in which theory, data and themes are identified and elaborated” (Bergman & Bergman 2011, p. 39). Although coding of data leads to a certain level of decontextualisation, an important analytic step is to re-contextualise findings – a process whereby the researcher returns to the original data to reconfirm interpretations within the original context from which the codes were derived. All interpretations are, furthermore, substantiated by evidence from the data as illustrated by the data excerpts provided throughout the results sections. This, furthermore, has

important implications for the role of the researcher in terms of reflexivity, which divides into a continuum wherein a positivistic objective representation of the data (see for example Denzin & Lincoln 2003) lies on one end and a shared intersubjectivity wherein researchers and participants become collaborators in the research project (Hammond & Wellington 2013) lie on the other. Within a CCA analysis, the role of the researcher lies somewhere in the middle since the researcher is intimately involved in both the process and the production of the research (Horsburgh 2003). However, all levels of analysis always remain data-driven. Fourth, CCA is a flexible method that can be used to analyse all non-numeric visual, audio, and textual data (Bergman & Bergman 2011). In this research, it is used to analyse interview data, but it can also be used, for example, to analyse reports, newspaper articles, and social media streams, such as Twitter, photos, drawings, and videos. This method has been applied to conduct empirical research in a number of fields, including business studies, economics, education, health, philanthropy studies, psychology, sociology, and sustainability studies (Bergman & Bergman 2019). Fifth, depending on the particular research focus, theoretical framework, or researchers' interests, CCA has several starting points (Bergman & Bergman 2011). For the mobility as agency studies presented in this thesis, for example, the starting point is the concept of personal agency and the Model of Triadic Reciprocal Causation. Connecting this framework to the mobility experiences of interviewees will facilitate the process of identifying various agentive pathways that define mobility practices within particular contexts. Sixth, CCA is always embedded in substantive theory (Bergman & Bergman 2011). In line with the flexibility of this method, theory may guide the analytic process from the beginning, as is the case with using mobility as agency as a framework for analysis, it may be integrated during analysis by, for example, deciding to use a specific theory to conduct a quasi-deductive analysis, or it could be used to develop theory, akin

to the approach adopted in grounded theory (Bergman & Bergman 2011; see also Glaser 1992 or Bryant & Charmaz 2011). Seventh, while CCA is a distinct, stand-alone qualitative analysis method that can be used by itself, it can also be integrated to form part of a larger research design (Bergman & Bergman 2011). In the first study presented in this thesis, for example, CCA is used as a stand-alone method. In the second, third, and fourth studies in this thesis, CCA is used as part of a mixed method design known as Hermeneutic Content Analysis, outlined in more detail below. Eighth, to illustrate the systematicity of the analysis, analytic procedures are always explicitly described in the methods section and presented in the results as can be observed in Chapters Two, Three, Four, and Five (Bergman & Bergman 2011). Ninth, the complexity with which a CCA analysis is conducted is research- and researcher-defined (Bergman & Bergman 2011). This means that an analysis can be fairly simple and conducted on a small sample of data, “but it can also deal with multi-media data sets, large samples, and complex, multi-dimensional phenomena” (Bergman & Bergman 2011, p. 40). The degree of complexity should be based on balancing access to resources (especially time and money), the skill of the researcher, and the specific research focus of the study. Finally, the findings from CCA can be used to inform additional research, whether qualitative, quantitative, or mixed methods (Bergman & Bergman 2011). The potential of future research based on the findings from the studies presented in this thesis will be discussed in Chapter Six.

Strategies to ensure rigour during the data collection included piloting the interview schedule to ensure that the wording and phrasing was appropriate for the target group, the order of questions did not lead to an order effect, and that people felt comfortable during the interview. Furthermore, the interviewer avoided asking leading questions during interviews. To ensure reliability during the analytic phase, other analysts were explicitly

involved during different stages of the analysis to discuss and settle divergent interpretations. Specifically, consensus building always included members and native language speakers from the target group from the three research sites (Mandarin/Chinese, US American, and Afrikaans and English/South African). This was further complemented by avoiding haphazard or selective reporting, which entailed that the analyses and interpretations of clusters and themes were always justified by clearly linking these to the empirical evidence: the interview data. The process of conducting a re-contextualization analysis, as described below, is also illustrative of this. In other words, interpretations were always grounded in the data by supporting the claims with evidence from the data.

In the first study, the research focus was on examining empirically the extent to which contemporary debates on sustainable mobility connect to the lived experiences of Metrorail commuters. It was based on the assumption that mobility is realised differently and has different consequences for individuals, depending on the specific context and their mobility potential (Kaufmann, Bergman, & Joye 2004). In this analysis, CCA was used to first identify mobility-related dimensions before sorting and classifying them according to the mobility options and conditions mentioned by Metrorail commuters. By systematically analysing each of the dimensions that make up the mobility experiences of commuters, this analysis could identify the actual and potential capacity of commuters to be mobile and how these connect to specific mobility preferences and behaviours. This focal point is used to define sustainable mobility from the perspectives of the commuters, which is then systematically compared with the dominant concepts and theories in the field of sustainability and sustainable mobility to gain a deeper understanding of how they diverge from one another and what implication this has on sustainability concepts and theories.

In the remaining three mobility as agency studies, data were analysed using Hermeneutic Content Analysis (HCA; Bergman 2010), a mixed methods approach. Whereas most mixed methods research designs seek to ‘compliment’ qualitative and quantitative data with one another during different phases of the research process as is the case, for example, with triangulation or sequential designs (Tashakkori & Teddlie 1998, 2010; Creswell & Plano Clark 2018), HCA combines qualitative and quantitative analytic techniques on a non-numeric, qualitative data set. It consists of three steps and can be visualised as follows:

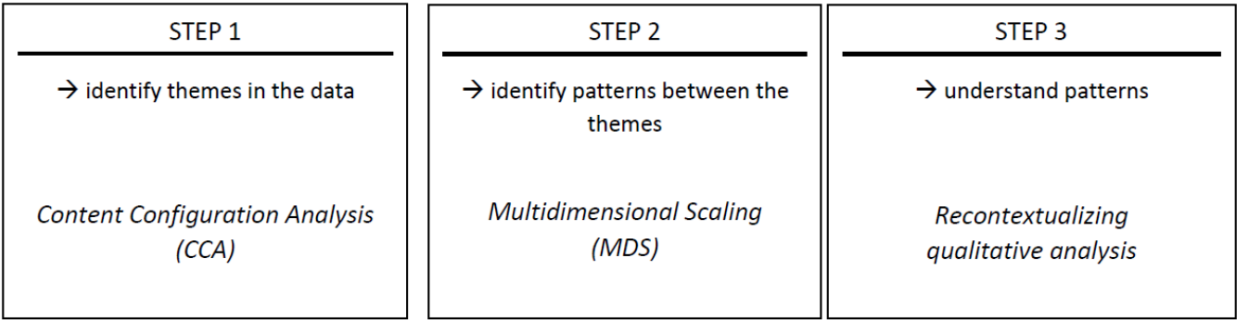


Figure 4. Three-step process of HCA (Berger 2016).

In step one, interviews were analysed using CCA (Bergman 2011; Bergman & Bergman 2011). In this step, data were coded deductively based on the dimensions of personal agency and environment as proposed by Bandura and conceptualised in the mobility as agency framework. The purpose of this step was to trace agency and its dimensions in the narratives of respondents from the three research sites.

The second step of HCA consisted of a quantitative dimensional analysis, which explored the underlying structures of the data. This was done by examining how the various

thematic dimensions identified during step one of HCA were systematically and structurally connected to each other using a technique known as multidimensional scaling or MDS. In this step, the themes identified during step one were transformed into dichotomous variables (using the presence or absence of a theme as a 'yes/no' within the interviews). These variables were then used to create a similarity matrix, which served as the basis for multidimensional scaling (MDS). MDS can visualise the relationships between the themes and examine their underlying structures based on the co-occurrences of these themes within a given unit of analysis.

The concrete procedures used in the second step depend on the characteristics of the data and the themes identified in the first step. In terms of the characteristics of the data, for example, the indices most frequently used to calculate similarity matrices of co-occurrence data are Association Strength and Jaccard (Borg, Groenen, & Mair 2012). The Jaccard Index works best when the distribution of the data between different themes are similar (as was the case with the studies presented in Chapter Three and Five). The Association Strength Index provides a more stable solution when the range of distribution of the data between themes is large (as was the case with the study presented in Chapter Four; see Borg, Groenen, & Mair 2012 for more details). To illustrate the clustering of themes more clearly, MDS and hierarchical cluster analysis can be combined. Coxon (1982), for example, proposed to embed the results of a hierarchical cluster analysis into the MDS map by using circles or arches. This method of representation is helpful, on the one hand, to illustrate the cluster structure of the data, or the themes and, on the other hand, to highlight the extent of separation between items composing a cluster (Coxon 1982). This approach was employed in Chapter Four to facilitate the interpretation of the MDS map (more details are provided below).

Specifically, the second step of HCA for each study entailed the following: In the study on car users in the US, the similarity matrices were calculated using the Jaccard Index based on thetar (Berger *forthcoming*) and smacof (Mair, De Leuw, Borg, & Groenen 2015) in R. Here, the unit of comparison was at the code-level (n=1071), and the model parameters included a non-metric procedure with a primary approach to ties. Stress at 0.07 was comparatively much lower than the stress level for a random sample of the same number of points in MDS, estimated at 0.22 (Spence 1979). In this analysis, the dimension collective agency was excluded given that respondents rarely mentioned it and its inclusion would have unduly biased the MDS map. Here, a two-dimensional map was found to be the most interpretable solution and adding an additional dimension did not significantly improve stress but worsened interpretability.

In the mobility as agency study of Metrorail commuters in the Western Cape, the similarity matrices were calculated using the Jaccard Index based on thetar (Berger *forthcoming*) and smacof (Mair et al. 2015) in R. The unit of comparison was at the code-level (n=784), and the model parameters included a non-metric procedure with a primary approach to ties. Stress was at 0.11, which is comparatively lower than the stress level for a random sample of the same number of points in MDS, estimated at 0.24 (Spence 1979). A two-dimensional map was found to be the most interpretable solution since adding an additional dimension did not significantly improve stress but worsened interpretability.

In the study on train commuters in Beijing, the coding of the interviews yielded 964 codes for the MDS. The similarity matrices were calculated using the Association Strength Index and the analysis was based on thetar (Berger *forthcoming*) and smacof (Mair et al.

2015) in R. The model parameters included a non-metric procedure with a primary approach to ties. Stress was 0.14, compared to 0.24 for a random sample (Spence 1979). To facilitate the interpretation of the MDS structures and more clearly illustrate the cluster structure of the data (see Coxon 1982), the same similarity matrices were used to conduct a hierarchical cluster analysis using the Complete Linkage Method in R. The most parsimonious solution was found to be between the second and third levels of the dendrogram, which contained the largest gap between levels while avoiding parsing dimensions into too many branches. This solution was also the most interpretable. The first two levels were graphed onto the MDS map to show the connections between clusters as well as the extent of separation between the items composing a cluster and the different clusters (Coxon 1982).

Using MDS to visualise how the different thematic dimensions from step one systematically connect to each other, this second analytic step enabled the modelling of agentic pathways and mobility environments by creating a geometric representation of how agency and environment dimensions co-occur in the data. Significantly, MDS can visualise where patterns in the data exist, but it cannot account for what they mean. Accordingly, the third and final step of HCA consists of a re-contextualising qualitative analysis to connect the MDS structures to the interview data, again using CCA. This step helps interpret the meaning of the MDS patterns by referring back to the interview data in which the MDS structures are embedded.

Using HCA to analyse, compare, and contrast the agentic potential of individuals in different research settings enables not only to trace how mobility as agency unfolds in different context, but also to examine how mobility practices are systematically similar

or different. Using HCA to study mobility as agency can account for the various intra-individual and psychosocial dimensions, socio-structural, and technological environmental dimensions that make up mobility practices. It enables an empirical application of the conceptual framework and, through this application, allows for the exploration of the potential contribution psychology can make to the field of sustainable mobility.

Ethical Considerations

The research was granted ethical clearance by the University of the Witwatersrand's ethical review board on 24 June 2016 (see Appendix 2 for the ethical clearance certificate) and conformed to the codes of professional conduct for researchers set out by The American Psychological Association's Ethical Principles of Psychologists and Code of Conduct (APA 2017). This includes the five general principles of beneficence and non-maleficence, fidelity and responsibility, integrity, justice, and respect for people's rights and dignity, as well as other specific ethical standards. These include, for example, standards relating to anonymity, confidentiality, safeguarding of participants, safekeeping of data, and the adequate reporting of data. Even though anonymity could not be assured since participants became known to the researcher during face-to-face interviews, confidentiality was central to all levels of analyses, writing-up, and dissemination of the research. Interviews as well as coded data were given unique identifiers, which were meaningful to the researcher but rendered participants otherwise unidentifiable. Based on maintaining participant confidentiality, permission was sought to conduct and record interviews and that recorded data was used for research purposes. Research participants were advised that their participation was voluntary and that they could withdraw from the

study at any time without penalty or consequences. In this regard, it is also important to note that, according to APA standards, this study posed minimal to no risk to research participants since the research topic was not deemed ‘sensitive’ by nature. Data collection did not place participants at risk (Creswell 2003). Given the non-invasive nature of the topic and that all participants were consenting adults, no special data collection precautions or preparations were required. Steps were taken to ensure the safe storage of data. After transcription, the original recordings were destroyed and electronic copies and participant information were securely stored with password encryption. Finally, research findings were peer-reviewed and published in open-access journals to enhance dissemination of the results to the public.

Roles and responsibilities of researcher in each study

The research and results presented in this thesis form part of an international comparative study of mobility contexts in four countries. It is a collaborative effort embedded within a research team, and the pronoun ‘we’ evident in especially the empirical chapters is an explicit acknowledgement of this. It is intended to serve as a reminder that this research would not have been possible if not for the time, expertise, knowledge, effort, and dedication of the researchers who worked on the ‘imagineTrains Project’. I am grateful to have had the opportunity to be part of this overall effort. However, for the purpose of evaluating this thesis, I briefly outline below my specific contributions and responsibilities. These included:

- Selection, development, and adaptation of theoretical framework for this framework document and the four studies.
- Project management of all four studies.

- Authoring this framework document.
- Co-development of the interview schedule (with Max Bergman).
- Co-piloting of the interview schedule in three research sites (with Max Bergman and Zhao Lei).
- Data collection in the Western Cape and in the US. Half of the interviews in Beijing, as well as managing and training a local Chinese researcher to conduct the second half of data collection in Mandarin.
- Data cleaning including overseeing translations of interviews conducted in Mandarin, checking, editing, anonymising, and finalising transcribed interviews etc., preparing data for analysis.
- Coding and analysis for all four studies including CCA and HCA, MDS, and cluster analysis. Using analyses cycles to train junior researchers (Lea Schneider, Christoph Hänggi, and Zhao Lei) in qualitative and quantitative methods.
- Synthesis of findings (in collaboration with Andrew Thatcher and Max Bergman).
- Lead author in writing three collaborative peer-reviewed articles (in collaboration with Andrew Thatcher and Max Bergman). This included preparing and drafting the introduction, theoretical background, methods, results, discussion, and conclusion sections. Revising drafts based on comments from collaborators and finalising the manuscripts for submission to the journals.
- Writing one single authored peer-reviewed article.
- Managing submission and revision cycles of the publications with the journals.

Outline of the remaining chapters

The remainder of this thesis is divided into five chapters, which comprise four empirical chapters and a final discussion and conclusion chapter. The four empirical chapters outline the research studies that were published as peer-reviewed articles. These published papers have been integrated into these chapters in a Word format to enable standardising referencing and formatting styles throughout the thesis. The reference section from each publication was consolidated and is presented at the end of this thesis. However, given that each manuscript catered to specific journal requirements, some inconsistencies may remain. The title page of each article can be found in Appendix 3.

Chapter Two is entitled ‘Sustainable mobility between theory and practice’. It introduces the first empirical study, which is an attempt to connect the implicit assumptions of sustainable mobility with the challenging mobility environment encountered by Metrorail commuters in the Western Cape. This helps to question fundamentally, what sustainable mobility is or ought to be, especially in contexts removed from the mobility potentials of regions where sustainability theory is developed. Most of the arguments about the challenges and limitations associated with sustainable mobility outlined earlier in this chapter were initially explored in this publication. In other words, the first publication served as a quasi-literature review. The article by Zinette Bergman and Max Bergman is titled, ‘A Case Study of the Sustainable Mobility Problem–Solution Paradox: Motility and Access of Metrorail Commuters in the Western Cape’. It was published in *Sustainability* (impact factor 2.177) on 18 May 2019.

Chapter Three is entitled ‘Mobility as agency from the perspectives of car users in regions without developed passenger rail infrastructure in the US’. It introduces the first of three mobility as agency studies. Here, mobility as agency is used to examine the mobility practices of car users in regions without developed passenger rail in the US to make sense of what trains specifically and sustainable mobility more generally mean to them. The article by Zinette Bergman is titled ‘Trains in the Land of the Car: A Case Study of Mobility as Agency in the United States’. It was published in *Sustainability* (impact factor 2.177) on 27 November 2019.

Chapter Four is entitled ‘Mobility as agency from the perspectives of train users from Beijing, China’, and it covers mobility as agency in Beijing. The article by Zinette Bergman, Manfred Max Bergman, Christoph Hänggi, Zhao Lei, and Andrew Thatcher is titled ‘Technological change and sociocultural models in China: A case study of train users living in Beijing’. It was accepted for publication on 11 February 2020 in the journal *Mobilities* (impact factor 2.462) and was published on 27 July 2020.

Chapter Five is the final empirical chapter and introduces the mobility as agency study in the Western Cape. The chapter is entitled ‘Mobility as agency from the perspectives of Metrorail commuters in the Western Cape, South Africa’, and it is based on the publication by Zinette Bergman, Manfred Max Bergman, and Andrew Thatcher. It was published in *Frontiers in Psychology* (impact factor 2.323) on 15 March 2019. It is titled ‘Agency and Bandura’s Model of Triadic Reciprocal Causation: An Exploratory Mobility Study among Metrorail Commuters in the Western Cape, South Africa’.

Chapter Six brings together the individual studies by conducting a comparative analysis of the case studies employed in this research. Here mobility as agency from the three research sites is compared and then the implications of the findings in relation to psychology and sustainable mobility are discussed.

“History is written by the rich, and so the poor get blamed for everything”

(Jeffrey D. Sachs 2006, p. 17)

CHAPTER TWO

Sustainable mobility between theory and practice

Introduction

Although global mobility of people, goods, technology, and information has been one of our greatest opportunities and resources, it has come at tremendous environmental and social costs. The combined impact of the “Triple Cs” – CO₂, congestion, and human casualties (Geerken et al. 2009) – resulting from our mobility practices makes redefining our mobility practices and finding more sustainable ways to be mobile one of the greatest challenges of our time.

The field of sustainable mobility aims to “reduce the need to travel (less trips) ... reduce trip lengths, and to encourage greater efficiency in the transport system” (Banister 2008, p. 75). These goals are frequently cited in policy documents, forums, and websites across the world, and they are often visualised graphically in the green transportation hierarchy (Bradshaw 1992), as presented earlier. Sustainable mobility approaches inspired by the green transportation hierarchy aim to “unsprawl”, “decongest”, and “decelerate” our suburbs and cities to promote human-propelled modes of locomotion and large-scale public transport infrastructure, such as trains. The latter being especially favoured given a reputation for safety, a reduced carbon footprint and a high commuter load, which reduces road congestion. In terms of addressing the Triple Cs and achieving the goals of

sustainable mobility, public transport and especially trains seem practical and equitable solutions; as long as the implicit assumptions upon which these concepts are premised: wealthy, urban contexts with access to extensive, well-maintained, well-funded, and publicly supported mobility systems are present. Unfortunately, assumptions associated with sustainable mobility systems are difficult to reconcile with most regions around the world. Apart from many regions dominated by individualistic cultures, so-called ‘emerging economies’, where 95% of future urban expansion is projected to take place (UN 2016), also do not fit easily into the conceptual frameworks proposed by proponents of the green transportation hierarchy.

In the first article presented here, sustainable mobility is disconnected from expectations of wealth and infrastructure to examine the suitability of these concepts in contexts where spatial and social segregation, lack or decay of mobility infrastructure, and economic constraints are the norm. This is done by studying the daily mobility encounters of Metrorail commuters in the context of the Metrorail system in the Western Cape, South Africa, to better understand how commuters deal with mobility challenges, how they adapt their lives accordingly, and what sustainable mobility might mean from this particular context.

Studying the daily mobility encounters of Metrorail commuters, shows how access to mobility as a fundamental feature of mobility is a necessary but insufficient condition for mobility because of the inseparable link between mobility and aspirational, social, cultural, and economic features associated with mobility. To illustrate this, a culture-sensitive and context-specific mobility pyramid is developed based on the preferences and practices of commuters who participated in this study. The emergent mobility

pyramid stands in stark contrast to Eurocentric models of sustainable mobility such as the green transportation hierarchy. Comparing theoretical and aspirational models of mobility with models arising from mobility practices and experiences in the Western Cape, helps to illustrate some of the shortcomings in the sustainable mobility literature and explore the tension between what is considered sustainable and the consequences this may have on the lives of the majority of South Africans. Applying the green transportation hierarchy directly to the daily experiences of a respondent shows the inconsistencies between the ideals embedded in the sustainable mobility literature and the developmental needs of countries characterised by poverty and socio-spatial segregation. The central issue here is that contemporary concepts in the field of sustainable mobility too often fail to connect to the mobility realities of the poorer segments of South African society. This is particularly significant, considering that this population segment is also the one that is expected to contribute disproportionately to socioeconomic development. If sustainability generally, and sustainable mobility specifically, continues to privilege environmental protection over social and economic development, and if sustainability models are adopted that do not take into consideration culture and context, sustainability risks being reduced to a distraction practiced by a liberal, educated, and urban elite.

By highlighting some of the limitations associated with the prevalent mobility concepts in the field of sustainability, this study points to the need for developing a culture-sensitive and context-specific approach to better design mobility systems, which need to be adaptable to divergent mobility landscapes, developmental trajectories, and individual needs and expectations.

A Case Study of the Sustainable Mobility Problem–Solution Paradox: Motility and Access of Metrorail Commuters in the Western Cape

Bergman, Z., & Bergman, M.M. (2019). A Case Study of the Sustainable Mobility Problem–Solution Paradox: Motility and Access of Metrorail Commuters in the Western Cape. *Sustainability*, 11(10), 2842. <https://doi.org/10.3390/su11102842>

Abstract

Public transport in general and passenger trains in particular are often advertised as solutions to mobility challenges due to their relatively low carbon footprint, high commuter load, high public safety, and contribution to reduced road congestion. But, how do these advantages apply to contexts characterised by inequality, poverty, and exclusion, and where train infrastructure is underdeveloped and poorly maintained? In this study, we examine the imaginaries and their associated transport predispositions of Metrorail users in the Western Cape province of South Africa. Based on 31 interviews conducted with Metrorail users, we explored how they conceptualise access to and use of mobility. The conceptual framework for this is provided by the *Motility* concept as developed by Kaufmann, Bergman, and Joye. Findings show that the context and culture defining the daily lives of Metrorail users reflect a reality, which is far removed from the way we theorise sustainable mobility. The limitations of spatial and social inequality, which create the mobility boundaries of Motility for these commuters, reveal a significant gap between their lives and the policies aimed to foster our sustainable mobility future.

Despite this, the commuters of our study are highly mobile, and we end this article with an attempt to align these conflicting domains of dysfunctional contexts, mobility practices, and sustainability ideals.

Keywords: Sustainable mobility, trains, mobility access, Metrorail, motility, Western Cape, South Africa, Content Configuration Analysis (CCA).

We must all learn ... to think differently. We need to learn how to transform our policies and strategies to address the challenges of sustainability. To reach the poor and vulnerable, we need targeted policies, active outreach, and integrated information to inform decision-making. We need to recognise and understand the multiple dimensions of poverty and vulnerability, and how they interconnect. And we need to break down silos ... between the economic, social, and environmental aspects of development.

(Ban Ki-Moon, former UN Secretary General, 19 July 2016)

Look, I think that the service Metrorail provides is really terrible. I started using the trains in 2006. It was sad back then and now it is even sadder. It gets worse every year. (J, 1) (Each interview was assigned a unique identifier, denoted by a letter, followed by the page number of the transcript from which the quote was taken.)

Introduction

Our mobility reflects the best and worst of human development. The displacement of goods, information, technology, and people has alleviated extreme poverty for billions of people and increased the quality of life and wellbeing for many more. It has also enabled unprecedented access to education, work, health, family and friends, and consumer goods. However, it also harms our environment, health, and wellbeing. The costs of persistent and increasing road, water, and air traffic congestion, the continued dependence on fossil fuels and associated destruction, as well as the millions of victims of accidents and

pollution result in the “Triple C” challenge: How to reduce CO₂, congestion, and casualties (Geerken et al. 2009)? More precisely, how should societies reduce mobility’s social, environmental, and economic costs, while maintaining the potential for development (Holden, Linnerud, & Banister 2017)?

At its broadest and most abstract level, the literature on sustainable mobility borrows the Brundtland framework of consolidating economic growth, social development, and environmental protection with a particular focus on inter-generational responsibility or fairness (Greene, 2001, see also Holden, Linnerud, & Banister 2013; Holden et al. 2017). Accordingly, sustainable mobility is defined as “the ability to meet today’s transportation needs without compromising the ability of future generations to meet their transportation needs” (Richardson 2005, p. 30). By decreasing the dependence on private vehicles (Charlton 2004), encouraging modal shifts to public transport (IPCC 2007), and reducing the ecological impact of individual mobility behaviour (Holden & Høyer 2005; Hunecke et al. 2007), the main goals are ostensibly to “reduce the need to travel (less trips) ... reduce trip lengths, and to encourage greater efficiency in the transport system” (Banister 2008, p. 75; see also Holden 2004; Holden & Gilpin 2013). Many cities and regions across the globe are adopting some of these ideals, such as Baltimore and Portland in the USA, Vancouver and Calgary in Canada, Canberra in Australia, Birmingham and Windsor in the UK, Beijing and Chengdu in China, parts of New Zealand, the Philippines, and the Gauteng and Western Cape provinces in South Africa. Many cities and regions have embraced implicitly or explicitly the green transportation hierarchy, which ranks modes of transportation according to their degree of sustainability (Figure 5).

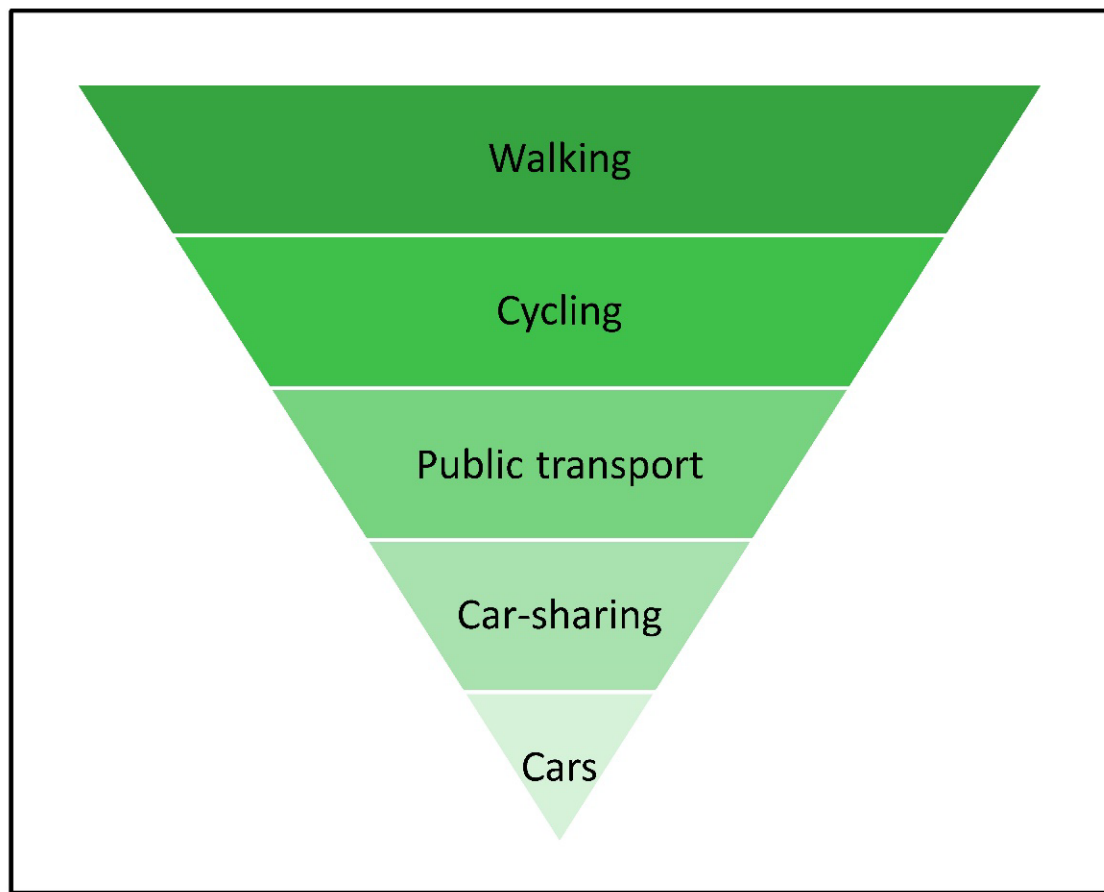


Figure 5. Green transportation hierarchy (Bradshaw 1992).

According to this individual transportation hierarchy, walking is the most sustainable form of mobility, followed by cycling, then public transport, such as buses, trams, and especially trains. High-occupancy vehicles or HOVs, which include car-pooling and car-sharing initiatives, are ranked next, and, finally, the least sustainable form of individual mobility encompasses single-occupancy vehicles (SOV) or private cars. This hierarchy is presented in numerous policy documents, urban planning forums, and government and city websites around the world, indicating not only the growing importance of sustainability more generally, but also an emergent normative agreement on how mobility and its sustainability consequences ought to be addressed: carbon-free cities in which

daily activities are reorganised into decentralised clusters that favour human-propelled modes of locomotion.

Despite some forerunners, most cities and regions around the globe are far removed from these ideals. Nevertheless, many politicians, non-governmental and non-profit organisations (NGOs and NPOs), academics, city planners, and engineers aim to “unsprawl”, “decongest”, and “decelerate” cities by fostering public transport because large-scale public mobility systems, especially trains, are considered sustainable, given their reduced carbon footprint, high commuter load, increased safety, and contribution to reducing road congestion. However, large-scale public mobility systems also create new problems or exacerbate existing ones (Bergman & Bergman 2015; Bergman, Bergman, & Pirie 2014; OECD 2015; Young & Kiel 2010). Kaufmann, Bergman, and Joye (2004, p. 735) described, for example, how access to large-scale mobility systems, such as the “train à grand vessel” (TGV) in France or EasyJet in Europe, not only revolutionised people’s perception of time and distance by creating new ways of living and working through “multi-residentiality”, “multi-locality”, and “multi-occupationality”, but they also created new forms of social and spatial segregation, since only a limited number of people are able to leverage these advantages. In this way, mobility systems may inadvertently aggravate inequality and unsustainability, and the major challenge to sustainable mobility remains identifying viable strategies to balance the moral imperatives of “satisfying human needs, ensuring social equity and respecting environmental limits” (Holden et al. 2017, p. 224). While the idea that large-scale public mobility systems contribute to new forms of spatial and social segregation is not new (e.g. Cass, Shove, & Urry 2005; Dupont 2004; Friedmann 1986; Grengs 2001; Power 2012), it seems to be largely absent from most debates on sustainable mobility. These

predominantly Eurocentric and urban mobility solutions tend to have a strong impact on emerging economies, such as South Africa. Yet, how feasible, context-sensitive, and culture-aware are these approaches in developing economies, where 95% of future urban expansion will take place (UNSDG11 2016)? This is the central focus of our study as we aim to explore the suitability of normative, Eurocentric mobility models of sustainable mobility in a stratified South African context. We do this using a qualitative approach based on 31 in-depth, exploratory interviews with Metrorail commuters in the Western Cape, South Africa.

Theoretical Background

The concept of accessibility, conventionally used in the fields of transport planning, urban planning, and geography divides mobility access into land-use, transportation, temporal, and individual components (Geurs & van Wee 2004), and it defines access in terms of individuals' potential to interact with mobility infrastructure (Hansen 1959). While focusing on road networks, travel speeds, congestion levels, and individual or household activity programs makes accessibility easy to measure and interpret (Geurs & van Wee 2004), this approach cannot account for the relationship between social determinants, such as inequality, exclusion, encultured mobility preferences, and mobility access.

To emphasise the socio-cultural dimensions of mobility access, Kaufmann, Bergman, and Joye (2004, p. 750) proposed that “spatio-social mobility may be realised differently or have different consequences across varying socio-cultural contexts”. To systematise this notion, Kaufmann and his colleagues expanded on the concept of *Motility*, which denotes

the actual and potential capacity of people, goods, technology, and information to be mobile. Motility is understood as a form of capital that enables people to access and utilise other economic, social, and cultural assets. It consists of interrelated components, relating to “*access* to different forms and degrees of mobility, *competence* to recognise and make use of access, and *appropriation* of a particular choice, including the option of non-action” (2004, p. 750). Given that our aim is to examine what access to sustainable mobility, such as trains, means to people in the stratified, developing context of South Africa, we focus primarily on access. According to Kaufmann, Bergman, and Joye (2004, p. 750), access refers to “the range of possible mobilities according to place, time, and other contextual constraints, and may be influenced by networks and dynamics within territories”. This range is defined by access to mobility options and conditions. On the one hand, mobility options consist of the range of transportation means and communication available to commuters, as well as commuters’ access to mobility services and equipment. Mobility conditions, on the other hand, refer to how accessible these options are in relation to the spatial distribution of infrastructure, the sedimentation of spatial policies, and the socio-economic position of individuals.

In this article, we use the access component of motility to examine train mobility in the Western Cape province of South Africa. Specifically, we analyse the perspectives of Metrorail users from two cities, namely Cape Town and Stellenbosch. As the largest commuter train service in South Africa, Metrorail transports approximately two million people per day (Bergman, Bergman, & Thatcher 2019). In the Western Cape region, it consists of four lines—the Northern, Southern, Cape Flats, and Central Lines. The network is made up of 610 kilometres of track and 119 stations, which primarily serve to connect settlements, townships, suburbs, towns, and cities (Bergman, Bergman, &

Thatcher 2019). Using the access component as proposed by the theory, we examine how commuters navigate and conduct their daily mobility practices in relation to options and conditions, which define or constrain their mobility access. By examining these components, we aim to better understand what role mobility plays in their lives, as well as the implications this has on the greater mobility context of the Western Cape. The theoretical framework outlined by the motility concept lends itself to this study because South Africa, similar to many other developing economies, is characterised by high levels of inequality and exclusion, and because it faces a variety of structural problems relating to individual and public mobility systems (Bergman & Bergman 2015; Bergman, Bergman, & Pirie 2014; Pirie 2013; Pirie 2009). A study on mobility access from the perspective of users in a developing context can highlight potentials and challenges for a global mobility future, especially because current and future mobility practices in emerging contexts will be a significant determinant of how not only sustainable mobility but especially sustainability itself will take shape globally. Accordingly, this article has three aims: (1) to systematise the options and conditions of mobility access as reported by the Metrorail users we interviewed; (2) to examine how these interactions shape commuters' potential to be mobile not only in relation to Metrorail, but also to the greater mobility context of the Western Cape region; and (3) to explore how the perspectives of these Metrorail users on mobility in general and trains in particular connect to notions of sustainable mobility.

Materials and Methods

This qualitative study is based on 31 interviews conducted with Metrorail users in the Western Cape, South Africa. Our sampling criteria included location (working or living

in Cape Town or Stellenbosch), mobility mode (Metrorail), and frequency of use (weekly use in the past two years). Consequently, most interviewees lived or worked in the vicinity of Stellenbosch or Cape Town. These two locations, approximately 50 km apart, provided a large geographic catchment area of people from varied backgrounds and introduced a diverse range of mobility characteristics. Some interviewees, for example, came from affluent suburbs in Stellenbosch and Cape Town, such as Claremont or Tygerberg, while others came from middle- to low-income communities, such as Brackenfell, Belhar, and Eerste Rivier. Some travelled from as far as Paarl and Wellington (an additional 40 to 50 km inland, which corresponds to a two- to three-hour train commute, one-way), and many lived in surrounding informal settlements and townships, such as Khayelitsha, Bonteheuwel, Langa, Mitchells Plain, and Kayamandi. Although the majority of our interviewees were daily commuters, some commuted only occasionally. Among the men and women we interviewed were students, teachers, security guards, shop attendants, cleaners, drivers, administrators, couriers, repair men and women, managers, occupational therapists, personal assistants, and unskilled labourers. Our interviewees were Black, White, Asian, and Coloured (Coloured is an official term used in South Africa to denote individuals from a mixed ethnic background. Different ethnic typologies exist but the statistical office and most recent population census use the labels Black (80.5%), Colored (8.8%), White (8.3%), and Asian or “Indian or other Asian” (2.5%). It should not be confused with pejorative and racist usages in other countries, referring to non-whites), and, although the interviews were conducted in English or Afrikaans, the two most widely spoken national languages (among 11), some of our interviewees also spoke Xhosa, Sotho, North Sotho, and isiZulu. Although this is not a representative sample, our interviewees reflected South Africa’s multi-cultural and diverse context. The interviews consisted of exploratory and semi-structured questions. Examples of

exploratory questions included “Tell me everything that comes to your mind when you think about trains” or “What is your best memory with a train?” (Bergman, Bergman, & Thatcher 2019). These questions aimed to elicit extended narrative responses regarding interviewees’ mobility experiences. Semi-structured questions included “When, where, and how often do you take trains?” or “What do you think will happen with trains in the future?”. These questions aimed to prompt specific mobility needs, preferences, and aspirations.

We analysed the interviews using content configuration analysis (CCA; Bergman 2011; Bergman, Bergman & Gravett 2011). CCA is a type of qualitative analysis related to qualitative content and thematic analyses. It can be used on all non-numeric data including written and visual sources (Bergman, Bergman, & Gravett 2011). It is applied in the fields of education, health, business studies, psychology, economics, philanthropy studies, sociology, and sustainability studies. The main strength of this method lies in its flexibility, since analytic strategies can be adapted to research foci or researcher needs (Bergman, Bergman, & Gravett 2011). In this study, for example, we used CCA to conduct a quasi-deductive analysis based on theory-guided top-down coding, using the access component of the motility framework as a structuring principle and coding framework (Kauffman, Bergman, & Joye 2004). As a first step, we identified all mobility-related elements in the data. Next, we coded and classified these using the dimensions of motility access. This analysis enabled us to (a) identify if the dimensions of motility as outlined in the theory were present in the interviewees’ narratives, and (b) how these dimensions relate to the particular mobility experiences of commuters in the context of Metrorail in the Western Cape. Finally, we analysed each dimension of motility access to systematise what they mean from the perspective of the Metrorail commuters.

Systematising the range of motility options and conditions that characterise the daily mobility experiences, and how they constrain actual and potential capacities of commuters to be mobile allowed us to link mobility preferences and behaviours with the mobility context and environment.

Results

We sorted the data according to these six dimensions across a macro-, meso-, and micro-level, as illustrated in Figure 6.

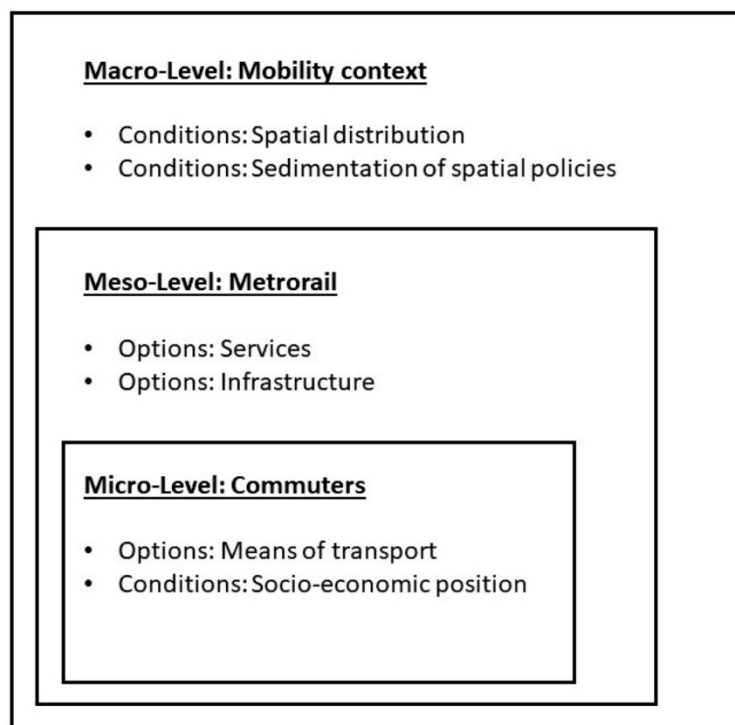


Figure 6. Motility access from the perspectives of Metrorail interviewees.

At the macro-level, motility access relates to the greater mobility environment, specifically the spatial distribution of mobility infrastructure and the sedimentation of spatial policies. At the meso-level, motility access concerns Metrorail services and

infrastructure. The micro-level connects Metrorail commuters to their means of transport and socio-economic position.

Macro-Level: The Greater Mobility Environment

Spatial distribution of mobility infrastructure: Metrorail commuters described their greater mobility environment predominantly in terms of the limitations of public transport infrastructure. These limitations manifested on multiple levels. Regionally, public transport was reported as restricted or unavailable, modal choices as limited, and existing infrastructure as too far away. Two examples are provided below.

When the trains are late, what are you supposed to do? You must just sit and wait because you don't have other alternatives. There isn't a taxi here that you could take, or there isn't a bus service in place. (A, 3)

You see, because when it is off peak, even for us who need to walk home from the station. For women it is actually more dangerous. And you see, in the area where we live, where I live in Kleinvlei, the police station is right next to the train station, which means they are very visible so the people can walk and so on. But see now its winter and it is dark early. So already by 6 o'clock, its dark and then people still have to walk. So, no way. It is really very dangerous. For a woman to walk that time of the morning or evening is very dangerous. (W, 4)

From the perspectives of the Metrorail commuters we interviewed, the spatial distribution of mobility infrastructure was defined in terms of its lacunae. Commuters reported that

mobility networks were either underdeveloped, dilapidated, or non-existent. Examples included that the entire catchment area of the Stellenbosch region was serviced by a single-track rail line, which caused frequent and long delays, or the differential levels of service between Northern and Southern lines or between the so-called “business trains” and the “normal trains”, the former receiving preferred treatment at the expense of the latter in terms of scheduling, solving delay issues, and overall service. Also mentioned was the absence of a feeder bus system, which resulted in long, inconvenient, or dangerous journeys to reach train stations. In some instances, commuters walked for more than one hour, sometimes starting well before 5:00 a.m., to reach the nearest station. Consequently, this lack of mobility infrastructure placed significant constraints on their mobility access.

Sedimentation of spatial policies: Public transport policies were described in similar terms since commuters reported that policies were either lacking or promised improvements were not implemented. Some examples are provided below.

They say that by next year they will launch a new system but I know that nothing is going to come of it. I don't think it's the trains that are the problem. I think it is the way it is being managed. [...] Because a management that is focused on service delivery will not provide a poor service. They would maintain things well. They would ensure that the trains are running on time. Um, they don't really care about the people. (J, 2)

That's why, that's why, their planning was really very, very bad for these lines. [...] They really need to, they really need to improve their service. Funny enough,

I actually saw the other day in the Argus [Cape Argus, a local newspaper] that they are planning to. But you know they always make plans and makes plans and make plans, and nothing ever comes from it. The Minister of Transport has, just the other day. There was an article in one of the newspapers: They are planning to do something but they never get so far to actually deliver anything. So, it's really, it's really a problem you know. It is a big problem and unfortunately this is the way it is. (W, 2/3)

When interviewees spoke of mobility options, they lamented the inadequate mobility planning of their mobility environment. According to interviewees, politicians often promised infrastructure investment, better services, or more alternatives, which rarely materialised. Many commuters believed that regional spatial policies were either insufficiently formalised or non-existent. Consequently, many commuters felt trapped in a deficient mobility environment characterised by the absence of a vision for current or future public transport. The stasis of their mobility environment and the lack of policy intervention to remedy it left commuters feeling abandoned by policy-makers, who, according to our interviewees, were unconcerned for their welfare. In this context, many of the commuters we interviewed had access to only one public mobility source, Metrorail, while the only other mobility option was walking.

Meso-Level: Inside the Metrorail System

Mobility options relating to the Metrorail system were located at the meso-level, particularly with services and infrastructure. Inadequacies of services manifested in several ways. According to our interviewees, commuter demand often outstripped

carrying capacity, especially during peak hours, which resulted in severe overcrowding. Commuters also reported frequent delays and breakdowns, such as when “the train simply stops in the middle of nowhere” for long periods of time (J, 6), which contributed to discomfort, given the lack of facilities and summer heat or winter cold. They also mentioned that replacements for cancelled services were rarely provided, which further exacerbated overcrowding. Some examples from our transcripts are given below.

Yes, you see their name is not really Metrorail; their name is Metro-fail. No really, because you pay R133 [just over United States dollars (USD) \$9] for a [monthly] train ticket, which is fair-and-square, which is nice; the cheapest transport that exists. But their service is pathetic ... pathetic. Overcrowded trains, train delays, no announcements, you know. (W, 1)

Metrorail ... Terrible service. Dirty trains. Um, affordable. Waiting. In the past thirteen days there was just one day when all the trains, and I use four trains every day, there was just one day when all the trains were on time, all of them. (J, 1)

It happened in the morning. I was writing [exams] that morning. So, the trains were delayed, and they had been delays from early in the morning. I had no other option ‘cause it was internal exams. Internal exams, my teacher shows no mercy. If you’re late, you’re late, you not gonna write. And it was June so I needed the marks to apply to university. People started clapping [she claps her hands loudly], the train came and people started to get on. I tried to get on, I tried, I fought and I fought. Then I could, one foot was on but the other foot was not. My bag was outside, my face was inside. I was holding on by the doors there, you know, onto

the frame. I was holding by the door frame, so when the train was about to approach Bellville, it makes a turn but like a huge turn. I almost fell. If it was not for the person that was next to me, but a bit to the inside, I would have fallen. Cause this guy saved my life, he just grabbed me by my shirt and tie and held onto me. And then I couldn't breathe because I have asthma. I had already given up, I was going to die. But he pulled me in and other people also noticed that I was fainting. There was, I don't know what happened, I don't know where the people went, there was space, like they made space. I was able to lie down and then they gave me a space to breathe, but I almost died. (Y, 8)

Frequently connected to the inadequate service was the dire state of Metrorail's infrastructure. According to interviewees, trains were old and dilapidated, and the associated infrastructure was not maintained. Windows and seats were dirty, broken, or missing, and carriage doors did not function properly. Also reported were dilapidated train stations and platforms, malfunctioning communications and signal systems, and stolen copper cables that would bring the train system to a standstill. Some examples are provided below.

The trains themselves, look, there are some of the trains that are so dirty you can't see out of the windows and they don't tell you at which station you are arriving. So, if you don't know the route and it's dark then you just guess. Sometimes you can't even see what's going on outside unless you open the window and, in the winter, this can become very uncomfortable when it is cold. So, this is really a bad service. (J, 5)

Well, it can't get any worse or much more anyway because they are just falling apart. I once reported a carriage that was so dilapidated that I thought it was unsafe. It felt like a wheel was going to come loose. These days it happens regularly that a train just stops in the middle of nowhere and then they say the train is broken. It can't go any further. I don't know what they do with it then, but it is just the service that becomes even more disrupted. (J, 6)

While services and infrastructure accounted for the majority of data located in this access cluster, we identified a third dimension that related to the way people acted as a constraint to other peoples' access and use of trains. Some examples are provided below.

There were some days, sometimes when people have stolen the power cables. So the people can't go to work for at least a day or will be late by two or three hours. So yes, I think this is actually a terrible experience, especially if there is work to be done. They steal the cables a lot, yes. (N, 2)

I remember it clearly. I was on the train with my mother, and this guy who came in like a normal guy, he then approached this pregnant woman and asked for her earrings, 'cause she was wearing diamond earrings, beautiful earrings. Then, he kindly asked for the earrings, so obviously the lady said "no". You know, like any other person. So, then he took out a gun, and then we all then realised, "oh, my gosh, this is a robbery". Then he told us to get down on the floor. So, we all got down and then this lady was just refusing. Guess what? She took the earrings and threw them outside, and said, "go, fetch them if you want them". Then the guy took her and threw her out [of the open door]. Yes, he threw her off. Like, that

was the last time, that I used trains in my life. The last time. So, imagine with that trauma. (R, 3)

Based on the experiences of the commuters we interviewed, we identified three types of human constraints: a threat to commuters, a threat to train infrastructure, or a threat to the functioning of the mobility system. Examples of the latter included commuters accidentally falling out of open doors, from the roof of trains, from riding illegally between carriages, or from accidents caused by pedestrians or vehicles failing to obey railway signals. Threats to train infrastructure occurred, for example, when angry and frustrated commuters vandalised trains, or when cables were stolen and sold for scrap metal. The most frequently mentioned human constraint to access, however, related to personal safety because of “skollies” (Afrikaans slang for thugs or gangsters). While most reported incidents related to theft or armed robbery, the vast majority of the Metrorail commuters we interviewed had been affected by gang-related violence, assault, murder, rape, vandalism, or drunk and disorderly behaviour.

For all interviewees, unsatisfactory services, dilapidated infrastructure, and the possibility of becoming a victim or witness to a crime are part of Metrorail commuting. The experiences associated with services, infrastructure, and crime shape mobility system expectations, as system expectations shape mobility experiences. In this context, motility conditions such as the spatial distribution of mobility infrastructure and the sedimentation of spatial policies (or lack thereof) reveal how challenges constraining the mobility of the Metrorail users were not limited to Metrorail services but extended to the greater mobility environment in which Metrorail is embedded.

Micro-Level: People and Their Environment

The actual and potential capacity of commuters to be mobile at the micro-level of motility access connected to the commuters themselves and was mainly associated with the means of transport and their socio-economic position. The characteristics defining macro- and meso-levels intersected with commuters' mobility needs and aspirations. To examine how this manifested, we sorted interviewees' mobility preferences according to means of transport and the meanings they attach to them. Based on our analyses, we found that preferred mobility choices formed a distinct hierarchy, as depicted in Figure 7.

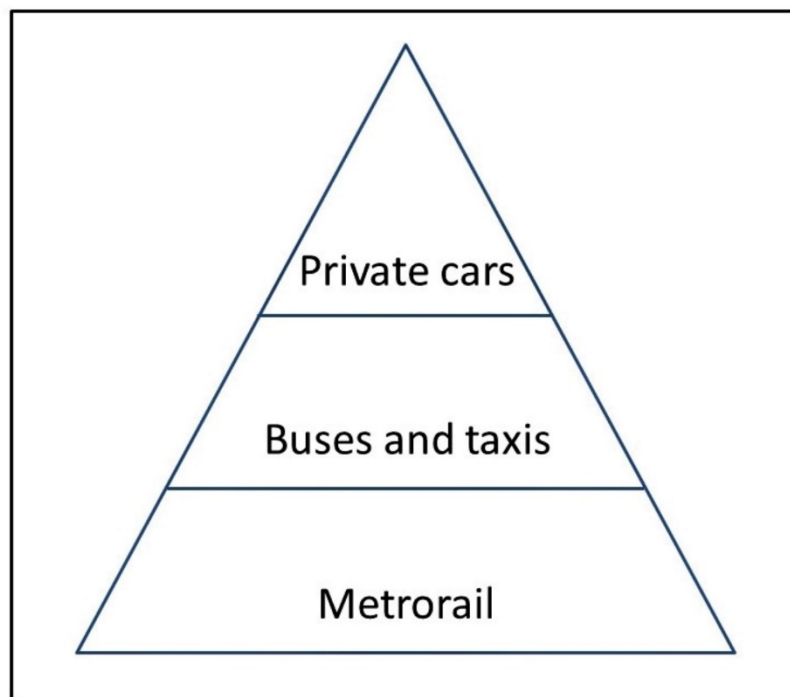


Figure 7. Preference of means of transport as ranked by Metrorail users.

Private cars occupy the top of this pyramid, whether or not the interviewees had access to a car. Cars were valued for their convenience, flexibility, comfort, reliability, and status. Instances in which Metrorail users resorted to car use, often shared, included

important meetings, early-morning appointments, late-night events, weekly grocery shopping, special celebratory occasions, and transporting children. Indeed, most commuters reported that they would not take children on a train. Some examples are provided below.

Interviewer: Why don't you use trains more often?

Interviewee: Because using the car is more convenient. If I don't have to sit and wait for transport then I am not going to do it. When I can just get in and go, that is what I would do, that will always be my first choice. (E, 4)

If you miss a train, then you have to wait. So how do you deal with that when you need to get to work? With your car, you can make up some time, you can give the throttle a little bit. That's the only thing with trains, yes. [...] Now these days, I don't use it anymore because I have to do a lot of things so I have to save time. But I also have to save money but I can't save money. Because with our trains you can't save time so you actually waste time so that's why I don't use the trains anymore because I have to use my car to move around. (N, 1/3)

Other forms of public transport, such as buses and especially 8–30-seater minibus “taxis”, occupy the second tier of the pyramid, as approximately 14 million South Africans use taxis daily. Reported as less convenient than private cars but still faster, safer, more efficient, and in closer proximity to where commuters lived, taxis have a fixed route but are flexible where they pick up and drop off passengers along their route. Taxis are also used to get to and from train stations. Thus, a work commute usually consists of walking before catching taxis or trains—nearly 10% of South Africans commute to work or school

for three hours or more per day. Our interviewees tended to limit their train use to work commutes and used alternatives, especially taxis, on weekends. Overall, commuters reported that they prefer buses and taxis to trains. Some examples are provided below.

Interviewer: And do you think trains will be part of our future?

Interviewee: It better. We need it. We have too many cars on the road. Public transport is really terrible. I think the city of Cape Town is trying to do something about it with this new fast-tracked bus service. Um, unfortunately, it is not in the area where I live but what I have heard about it is that it is a very good service. (J, 6)

Interviewee: No way, forget it [he shakes his head]. No, I have now, like I said, only take it to work and back. [...] When I am home, I would rather take a [minibus] taxi or a bus. Interviewer: Why would you rather take a taxi when you are at home?

Interviewee: Because it is quicker. The taxi is quicker and it picks you up near your home, and it drops you off near your home, and so on. So, if you have to go quickly, 10, 15 minutes, if you want to be somewhere quickly, then you take a taxi and of course if you want to go to the city it is a naturally a completely different story. A completely different story. (W, 5)

I prefer the bus. [...] It's safer. You are almost guaranteed that you'll get a seat. And it doesn't really run late, and you get to school on time. And when it's raining, you don't worry about it delaying or being cancelled. (Y, 9)

Metrorail, located at the bottom of the pyramid, was considered an affordable but least preferred mobility option. Affordability was reported as its most positive attribute, mentioned by nearly all interviewees. Some examples are provided below.

But we need the trains. There are thousands of people that use it every day and they don't have any other transport. (J, 6)

Their price is really reasonable. It's much cheaper than what it would be with a car or a bus. As the price of petrol continues to rise more and more, people will become dependent on the train. (A, 3/4)

[Metrorail] is inconvenient versus cost-effective. In the sense that it is always late, it is always overcrowded, and it is always wet or it is always too hot. (G, 1)

Metrorail's affordability, however, was also considered a trap toward dependence on the most underserved, inconvenient, and unreliable form of transport as stagnating wages, high unemployment rates, and rising petrol and food prices drained household budgets and made it less likely for the state to invest in, and commuters to afford alternatives.

By ranking mobility types according to preferences, we identified characteristics that related to how mobility modes are defined and separated. Privately owned cars were valued for their convenience, flexibility, comfort, reliability, and status. Buses or taxis offered no social status and much less flexibility and autonomy, but provided reliability and convenience due to geographic proximity, availability, and speed. Metrorail lacked these qualities and was, thus, unable to fulfil commuters' needs. Cost was an additional

quality associated with this hierarchy. At the top of the pyramid, Metrorail users with access to a car frequently referred to trade-offs between cost and convenience, or cost and necessity. In the middle of the hierarchy, commuters reported how increasing fuel prices made alternative modes of public transport an attractive albeit inaccessible alternative, while most commuters at the bottom of this pyramid depended on Metrorail because it was the only or cheapest mobility option (W, 1). Thus, economics and status further defined this pyramid. While mobility preferences shaped the content of this hierarchy, it was the purchasing power and, by implication, status aspirations that ultimately maintained clear boundaries between the three mobility modes, evidenced by how our interviewees separated people into three categories: the poor, who walk or are stuck with Metrorail; “normal” people, who, depending on situation and context, may flexibly select from a variety of mobility modes; and the rich, who own and use cars.

Metrorail commuters who owned cars deliberately and selectively used train travel as an occasional and alternative mobility option, as the following two examples illustrate:

Um, I think it is really nice to take the train. I enjoy it. It’s relaxing, it’s a little bit more personal as opposed to when you sit in your car on your own. You know, it’s actually nice to be part of the community to go in and out of the community; to do some people-watching. And it is a, I don’t come from a background where people use a lot of public transport, and I find it interesting to see how other groups of people make their way through the day. I definitely prefer taking the train than driving. (M, 1-2)

Um, people get into trouble at work because they are always late. Often, I can go back and fetch my car, and go with my car. But many, thousands of people, don't have a car that they could take. This is their only transport. I use it because it is cheaper and because I can read while on the train. I can't read while I am driving.

(J, 2)

Car owners who commute by Metrorail often took the more expensive "business express", reporting that they enjoyed the train commute because it was considered relaxing; they utilised travel time to read, sightsee, or prepare for the workday. They also mentioned that trains offer a cheaper mode of transport although they emphasised that they did not use trains to save money. Among this group, train cancellations were considered an annoyance that could be overcome by using their private vehicles. For important events or when they needed to travel during rush hour, they preferred using their cars.

Using the terminology of our interviewees, the "normal" people were located between the rich and the poor. However, the "poor" is a misnomer because people who must travel are not the poorest in South Africa. Metrorail commuters tend to be employed, are actively seeking employment, or they have resources to access education, apprenticeships, distant family and friendship network members, and so on. Even a dysfunctional mobility system is an improvement over not having a system at all. Living near a station is substantially better compared to communities without Metrorail and its feeder system. Metrorail offers a low transportation stratum in a hierarchy, but many people would be unable to go to school or work, see a doctor, or visit friends or family without it. Thus, when our interviewees refer to the poor, they mean those who have funds

and a reason to take a train. Due to limited financial resources, the poorer commuters use Metrorail as their main form of transportation. The poor nevertheless reported access to alternatives, such as borrowed or shared cars, buses, taxis, or lift clubs. Their purchasing power was severely constrained and the costs associated with using alternatives required sacrifice and careful calculation. While the so-called rich and normal people were more flexible with regard to their mode of transportation, the former selected trains only for carefully selected and controlled trajectories; otherwise, they would use a car. The latter created a transportation patchwork based on specific contexts and motility needs, underpinned by a cost–benefit analyses of mobility options. Two examples are provided below.

Yea, yea, yes, I take it [the train] Monday to Friday, weekends I don't bother with the trains at all, like I've told you. We prefer to take the vehicle on the weekend of course. It is going to work out more expensive but you can do so much more with the vehicle because then you can do your shopping and things like that. (W, 6)

And I have really realised that it is very good to take the train. Because you can save so much money, especially if you want to go out more and if you want to ... Like in the past, I couldn't even afford to go out for breakfast or lunch. You know, on weekends, if I want to relax, then I take my baby out or we go on an outing. And before I always had to think about the petrol money and, now, I can just do it. Because I know that I just have to buy a [train] ticket and then I know I don't have to worry throughout the month, if I have to go to this place or that place. (G, 7)

The poor were associated with the bottom of the mobility hierarchy. They lacked the purchasing power to afford alternatives and found themselves locked into an ailing and unreliable train system. Some examples are provided below.

You see, I am actually one of those fortunate ones because those other people have to also do their whole shopping with the trains right? They are not as fortunate as some of us ... Just put yourself, try to put yourself in those people's shoes, that person who lives in Bonteheuwel [a township near Cape Town]. He has to go to Cape Town and now he has his whole months' worth of groceries or whatever. I mean when you have a vehicle you just load it into the vehicle and there you go. But now you sit with seven or eight bags that you now have to hold onto and oh no. No, thank you. Forget it. (W, 6)

We pay, even though we pay less, but we pay. There are so many commuters. We buy so many monthlies [monthly tickets]. How much money does Metrorail make? Why can't they do that? Why can't they give us a comfortable, convenient place to sit in? (G, 7)

These narratives illustrate the significant relationship between economics and mobility choice. As commuters' purchasing power diminished, so too did their access to mobility modes and variability in mobility choices. A growing dependence on this cheap but unreliable mode of transport was associated with a decline in autonomy, security, status position, and life options. Finding themselves at the mercy of a dysfunctional mobility

system, interviewees often expressed despair or resignation, as the following interviewees recounted:

Um, they don't really care about the people. Sometimes, when we are late, there are students on the trains who are supposed to be writing their exams. Once it happened that someone had the keys to open the bank and they are sitting with the keys, stuck at Muldersvlei station and can't take the train. Um, people get into trouble at work because they are always late. (J, 2)

For example, yesterday morning. My train is at 5:45 a.m. No announcements, nothing. The train arrives at 6:30 a.m. Do you see? Now I have to let the people at work know that the train is late, but they don't understand. It's very frustrating. (W, 1)

And there are some people who rely on the train to get to get them to work. And there are some employers who don't understand that sometimes the trains are just late and then they start to become difficult. And, so, it is possible for you to lose your job just because you use the train every day and because you need to trust it because it is your only transport that can get you to work. (A, 1)

It was this sense of capitulation and precariousness at the bottom of the mobility pyramid that was particularly striking. Although the relationship between socio-economic status and mobility access is not new or surprising, we observed a relationship between economic position and access that was not limited to how poor people lacked access or choice due to diminished purchasing power. Rather, we identified a poverty trap at the

bottom of this mobility pyramid that locked commuters into the Metrorail system. In a vicious cycle, people are trapped in an under-priced, affordable mode of transport that is unreliable and dangerous in ways that render their work and lives precarious, as outlined below:

- Metrorail cannot raise prices because its main customer base cannot afford a price hike and, worse, its infrastructure could be sabotaged because some customers would consider a price hike unjustified and unfair, given Metrorail's unsatisfactory service.
- Metrorail, thus, cannot modernise or expand services, which leads to further dilapidation, unreliability, and infrastructure decline.
- Given the high unemployment rate and availability of unskilled or semiskilled workforce in South Africa, employers have little patience with the poor who show up late or miss work due to a transportation breakdown. Long commutes, often in anticipation of delays or cancellations, in association with compromised diets and a poor health status among the most disadvantaged, further drain the energy and capacity of workers. Similar conditions and consequences are faced by commuting high-school or university students from the lowest income bracket.
- Especially commuters without alternative mobility options are, thus, caught in a trap because they are too poor to afford alternative and more reliable forms of transportation, causing the inability for Metrorail to improve its services and infrastructure.

In sum, the dysfunctional public transportation system available to the poor keeps them locked in an unreliable transport system, which locks them into precarious education,

work, and health situations, which keeps them locked in a precarious life situation, which keeps them locked in an affordable but unreliable and declining mobility system, which is unable to raise standards or increase service offers due to a lack of funding because their main customer base, the poor, are unable to afford higher prices.

An Exception to the Rule

As with most complex social phenomena, there are always exceptions to the rule. A good example here was the business train Metrorail provides in the Western Cape region. If we tried to fit this train into our mobility hierarchy, it would be placed at the top of the middle tier, above taxis and buses, but below private vehicles. This service provides a luxurious commuting alternative for business people at a premium price. This sub-division of Metrorail fits between cost and mobility mode and its association with comfort, convenience, reliability, and safety. Ironically, by removing affluent commuters from the first class section of a dysfunctional train system, and by developing a parallel train infrastructure, the business train side-steps the dysfunctionality of Metrorail's other trains at the cost of regular passengers. Worse, an affluent commuter class with a strong political clout and voice is, thus, eliminated from participating in reforming Metrorail. Affluent commuters are successfully pushing for an expansion of a privileged service, often subsidised by government funds, at the cost of mobility reforms that would benefit the majority of the population. The following examples illustrate the parallel train system:

You see there has always been this thing that has been bothering me. 'Cause I also took trains from Kuilsriver to Mitchell's Plein, so that line every time, every day, Monday to Friday at seven o'clock, there was a business class train that went past.

In a month that train went delayed about two to three times maximum. That's the only time it would delay. But, and the ticket they pay like, it's huge, I think it's R1000 [approximately 70 USD] a month and everyone in that train gets a seat. It's seven o'clock, every day, everyone has a seat, everyone has a cup of coffee, and everyone has newspapers. I understand that they can afford it but why is it that at, seven o'clock, the business class train is always on time, every day, and then the other trains just go whenever and however. That's always been one of the things bothering me. Like is it because we pay R150 [approximately 10 USD] a month? Is it because, I never understood, that dilemma, because if they say, "good morning Metrorail users, trains are delaying due to cable theft, maybe in so and so, Metrorail apologises for the inconvenience". Seven o'clock, the [business] train comes! Ahh, wasn't there cable theft? And I'm like "Whaaat?! What's happening? It's not right". [...] Why should there be a business class train that comes at this time for such people, and then our train delays all the time. (Y, 5-6)

And these days they have these business class trains that provide a service to the business people, but why can't they also provide this business class to us normal people? Because see now, these people get there in the morning, then they get a cup of coffee. They come and sit there and then they get a newspaper. But you pay extra for that train. You pay R1000 a month or something, I'm not sure. (W, 7)

Discussion and Conclusions

In this article, we analysed the access component of the motility framework, but also the greater mobility context within which access is embedded. This allowed us to link mobility preferences and behaviours with a mobility context and environment. That Metrorail is not fulfilling most commuters' expectations is well documented, and we embarked on this study with the understanding that the problems and challenges Metrorail commuters experience would be a central characteristic of our data. Our aim was not to catalogue characteristics of a dysfunctional system, but to better understand how commuters connect to, and integrate dysfunctionality into their mobility needs and aspirations. The ability to be mobile is inseparably linked to needs and aspirations, whether they are personal, social, educational, economic, or beyond.

The motility framework we draw on proposes that people's actual and potential capacity to be mobile is best understood by examining the space where spatial and social mobility intersect. A defining feature of mobility is access, a necessary but insufficient condition for mobility. Our study revealed a context- and culture-sensitive mobility pyramid, whose tripartite nature is formed by access, economic position, and the resulting degree of flexibility. This pyramid is not a mere representation of interlocking mobility networks in the Western Cape region. It reveals how dimensions of safety, convenience, dependence, reliability, status, and autonomy converge in a hierarchical mobility structure.

Also striking in our study was the emphasis on economic resources, rather than ethnicity or race, with which commuters differentiate themselves and others. While ethnicity is mentioned occasionally, it was not used as a consistent marker of differentiation. Over the past two decades, the lines of demarcation between class and ethnicity somewhat diverged in South Africa, and it was more difficult to differentiate narratives about the rich, normal, and poor people versus White, Asian, Coloured, and Black South Africans. There were rare instances where rich signified white, and everyone else (non-whites) was labelled as either normal or poor. However, this euphemism was exceptional in our data.

In some of our previous work, we emphasised the dangers of dismantling Metrorail and replacing it with a modern mobility system, such as the Gautrain (a modern commuter rail system linking, among other things, central business districts, universities, shopping malls, upmarket residential areas, airports, and, still to be realised, some townships between Johannesburg and Pretoria). In many ways, the Metrorail's business express trains seem to mimic an exclusionary, parallel mode of train mobility—it is indeed comfortable, reliable, and safe, but it is also prohibitively expensive for the majority of South Africans, and, although the situation is improving, it still does not serve enough areas where the majority of South Africans live and work. Upmarket train systems risk creating and maintaining new forms of social and spatial segregation, shifting a segregated society based on race to a segregated society based on class, while concurrently reinforcing and possibly exacerbating poverty and exclusion for the majority.

In this sense, it is the dysfunctionality of Metrorail that will keep it going because it remains the most affordable form of public transport for the masses. It will remain

affordable, even to poor people with jobs, and it is its cheapness of this mode of transportation that, in the absence of major structural reforms, imposes dysfunctionality on Metrorail. Thus, Metrorail is an enabler for poor people to reach distant jobs; however, given the strong relation between spatial and social mobility, it concurrently represents a hurdle to overcome in order to escape the bottom of the pyramid.

We began this article by introducing some of the main tenets of sustainable mobility as represented by the green transport hierarchy. This hierarchy, implicitly or explicitly, serves as the guiding framework for how sustainable mobility ideals are conceptualised in mobility studies and policy documents. Comparing the mobility hierarchy of our Metrorail users with the upside-down pyramid of the green transportation hierarchy, we observe how experiences and aspirations in the Western Cape are remarkably different from those propagated by the sustainable mobility paradigm. Comparing the mobility preferences of our interviewees with the green transportation hierarchy, we find that they are antithetical. At first glance, we may conclude that our commuters' mobility choices and aspirations are unsustainable because of their reliance on, or preference for fossil-fuelled and individual-based mobility modes, especially cars. However, is this really the case? What would happen if we used sustainable mobility ideals as the benchmark to evaluate the mobility context in the Western Cape? What would the implications be for the Metrorail commuter context?

One of our interviewees lives in Khayelitsha, an informal settlement on the eastern fringe of the city of Cape Town, just over 30 km from the central business district. She shares a 6-m² shack with her infant and her aunt. Her aunt is 53 years old and unemployed. She cannot read or write, and she depends on whatever income her niece generates to survive.

She neither owns a bicycle, nor does she use public transport, and she certainly has no access to a private vehicle. She rarely leaves the township, except for Sundays, when she walks to the nearby veld to attend an outdoor church service. During the week, she spends most of her time taking care of our interviewee's son and household. Every morning, she walks to the nearest water point to collect water for the day, which she carries back in a bucket balanced on her head. Some days she may do this several times. Occasionally, she walks to a nearby spaza shop, where she may buy phone credit or maize meal to make mieliepap for dinner. According to the green transportation hierarchy, and given that her mobility practices are limited to walking, she would be considered far more sustainable, compared to our interviewee, who uses taxis and trains to get to work a few times per week.

Although this is only an illustrative example, it exemplifies the challenges in applying Eurocentric concepts that are embedded in value systems and infrastructure availabilities that are difficult to translate into other contexts. That the aunt of our interviewee is attributed with a high level of sustainability in terms of her mobility practices is problematic, especially given that South Africa's official unemployment rate is at 27.2% (StatsSA 2018) and youth unemployment at 54.3% (Mcgregor 2017). People living in circumstances such as these cannot be thought of as sustainable, even from the narrow perspective of the green transportation hierarchy. Thus, sustainable mobility must be adapted to reflect regional contexts and cultures in order to avoid being reduced to the wishful thinking of an educated, liberal, East Coast or European urban elite. While there is a lot of mileage in the sustainable mobility hierarchy, it needs to be adapted to reflect different contexts and cultures. In our case study, for example, sustainable mobility theory needs to take into account the lack and skewedness of mobility infrastructure in this

developing and highly unequal society. Of course, if the first step toward sustainable mobility is to create an equal society and a well-funded and maintained mobility infrastructure, then the green transportation hierarchy mobility model would work. However, if we want to pursue a greater degree of sustainability when considering people's mobility in the interim (and, by extension and based on the motility framework, make the mobility of goods, information, and technology more sustainable), then we have to revisit the green transportation hierarchy to take into consideration, first, regional contexts and cultures and, second, the extent to which some groups, regions, and countries need to develop economically in order to become more sustainable—across mobility modes and well beyond.

This case study provides insights into the challenges and opportunities defining a specific, encultured mobility landscape, thus providing important considerations for the theoretical assumptions upon which we base our sustainable mobility aims. This study could serve as an important impetus from which to develop context- and cultural-relevant, large-scale studies on mobility practices and mobility development. There are multiple, inter-locking contextual and cultural characteristics that shape people's actual and potential capacity to be mobile. The effectiveness of sustainable mobility interventions will depend on policies that can adequately account for these variations. In the Metrorail context, this would mean creating policies which simultaneously address contemporary and developmentally inspired socio-spatial dynamics. Given the poverty trap and resulting dependency cycle, an obvious recommendation would be to initiate structural reforms, including a baseline mobility access to ensure that commuters have access to a functioning, accessible, safe, and affordable public transport infrastructure. Improving the status quo, especially in relation to safety and reliability, could be funded by eliminating a parallel “business train”

system. In addition, it is necessary to reformulate sustainable mobility theory and policies, which currently tend to privilege reducing environmental impact over the necessity of socio-economic development. The massive expansion of mobility of goods, information, technology, and people in the near future will take place mainly in the poorest and unequal societies. Sustainable mobility will only be attained through a global, national, and local commitment, through public and private partnerships, and through a careful balancing of socio-economic and environmental concerns. If sustainability privileges environmental protection over social and economic development, it risks being considered a luxury concern of educated, urban elites, especially in developing economies.

“I say let the world go to hell, but I should always have my tea.”

(Fyodor Dostoevsky 1864)

CHAPTER THREE

Mobility as agency from the perspectives of car users in regions without a developed passenger rail infrastructure in the US

Introduction

The development and implementation of sustainable mobility solutions in the United States face seemingly insurmountable challenges. The vast geographical landscape makes low-density, sprawling communities the norm (Banister et al. 2007; de las Heras-Rosas & Herrera 2019; Urry 1999, 2004). Many regions do not have a developed public transport infrastructure such as trains, and the history and culture of mobility is firmly rooted in the car. According to Banister (2011, p. 7), “[f]ree roads, free parking, cheap petrol, and universal, cheap driver licensing are widely viewed as a natural right”. From an agency perspective, this highly individualistic mobility landscape can be conceptualised as follows in Figure 8.

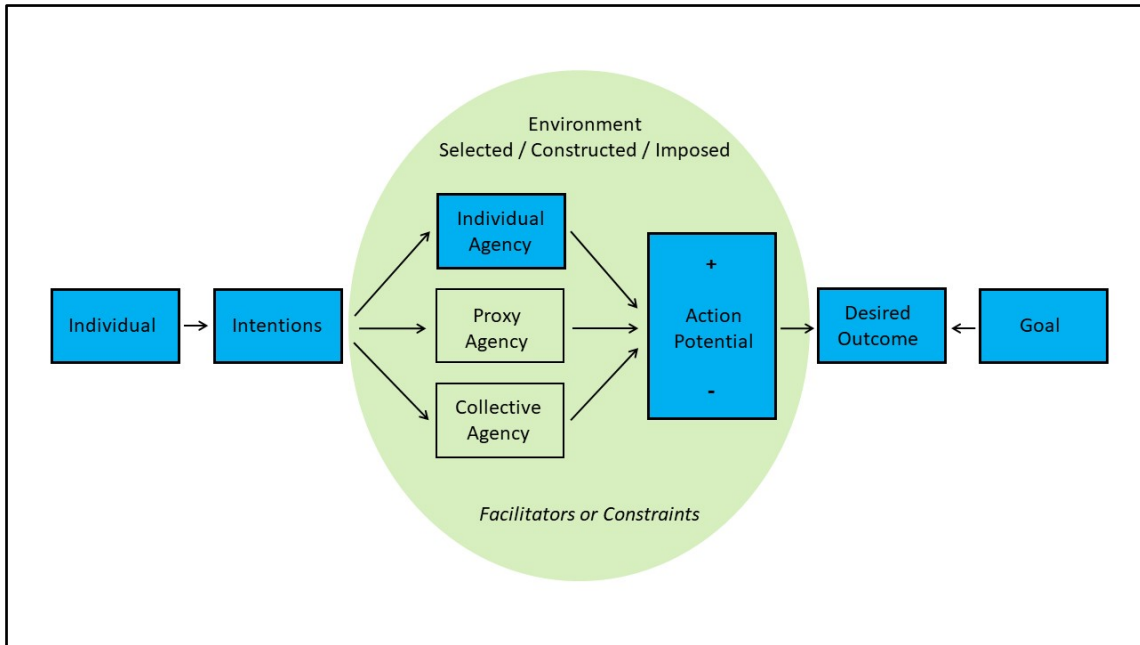


Figure 8. Mobility as agency of individuals in the US based on the mainstream mobility literature.

This car-centric landscape presents a formidable challenge to sustainable mobility (Banister et al. 2007; de las Heras-Rosas & Herrera 2019; Urry 1999, 2004): First, because most interventions are contingent on existing infrastructure, which offer more sustainable alternatives (Tillema et al. 2010; Arnott et al. 2014; Herring & Roy 2007; Cellina et al. 2019) and, second, because interventions rely on embedded sustainability values and the willingness of individuals to adopt new mental schemata, lifestyles, and behaviours, which would align more closely with sustainability goals (Banister et al. 2007; Black 2010; Ettema, Gärling, Olsson, Friman, & Moerdijk 2013). While the urgency for sustainable mobility interventions in contexts such as these are widely discussed (Banister et al. 2007; Banister 2011; de las Heras-Rosas & Herrera 2019; Urry 2004), studies examining the agency potential for sustainable mobility are rare.

The purpose of this second study is to contribute to this gap by exploring how car users in regions without a well-developed passenger rail infrastructure in the US make sense of their mobility practices. Using the conceptual framework of mobility as agency, this study explores mobility practices of a small sample of car users to better understand how these connect to more sustainable alternatives, especially trains. Specifically, the mobility perspectives of 32 car users from regions without developed passenger rail infrastructure in the US is analysed using a mixed methods framework known as Hermeneutic Content Analysis (Bergman 2010).

Findings from this analysis show that mobility as agency for these car users constitute two distinct pathways: a positively assessed individual agentic pathway and a negatively assessed proxy agentic pathway. Noteworthy also is that collective agency, defined by Albert Bandura as the interdependent effort to achieve a goal, is largely absent from the perspectives of the car users who participated in this study. The proxy agentic pathway, which relates primarily to the role of the local or federal government, is characterised by its failure to respond to individuals' needs or to invest in public transport infrastructure such as trains that would benefit "taxpayers" and, by extension, US society. The lack of access to alternatives, often only perceived, imposes a limited mobility environment on individuals in which they are unable to fulfil their mobility desires beyond using their private cars. Even a family car represents mobility constraints that appear near insurmountable from teenage years onward. The proxy pathway is contrasted with an individual agentic pathway. Characterised by individuals being able to pursue their own mobility wishes and desires on their own terms, this pathway aligns most with the theoretical assumptions of the mobility landscape in the US outlined above.

Unsurprisingly, this agentic pathway is deeply embedded in the permanent availability of private cars.

Furthermore, both agentic pathways are embedded in the same set of mobility expectations relating to comfort, convenience, and freedom. This US benchmark of mobility expectations guides how individuals assess and choose between different modes of mobility. Thus, a mobility mode is assessed as viable or attractive based on the extent to which it secures or exceeds benchmark expectations for comfort, convenience, and freedom. The role of the local, regional, state, or federal government as the proxy is to develop and provide access to mobility infrastructure that enables individuals to secure their comfort, convenience, and freedom through their mobility choices – without compromising these three qualities and without raising taxes. This relegates the role of the government to delivering a mobility environment that aligns with and fosters a mobility benchmark that can only be met with individual car ownership. Consequently, when car users in regions without developed passenger rail infrastructure are asked about trains, they claim to be interested in having access to them, but their support for extending public infrastructure is contingent on it conforming to their benchmark expectations. In other words, trains are a desirable mobility alternative as long as they provide individual comfort, convenience, and freedom, and as long as they do not endanger the primacy of cars, and as long as the development of train infrastructure is not associated with an increase in taxes. According to respondents, the failure of the government is not the inability to provide access to passenger trains, but rather the inability of the government to extend the mobility benchmark to other modes of transport such as trains. Given that the benchmark of mobility expectations of individual comfort, convenience, and freedom is the underlying function of both agentic pathways, it can be understood as the

foundation of mobility as agency. Based on these findings, an adaptation of the conceptual framework of mobility as agency accounting for the mobility experiences of respondents is represented below in Figure 9.

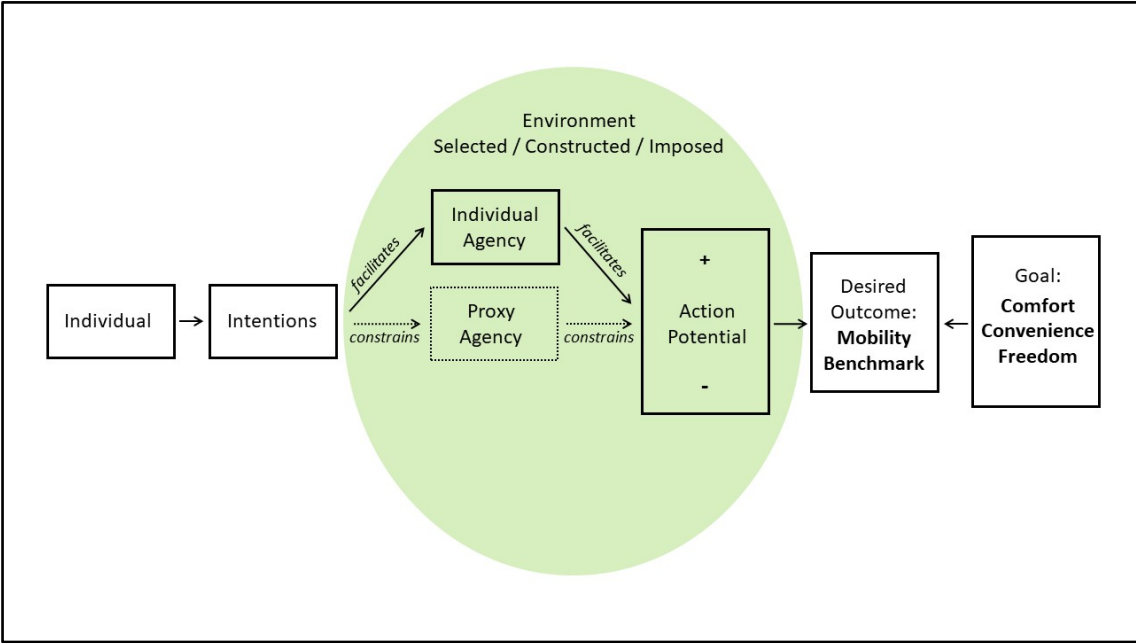


Figure 9. Mobility as agency from the perspectives of car users in regions without developed passenger trains in the United States.

As the foundation of mobility as agency, this mobility benchmark extends to define the boundaries and potential of sustainable mobility. Accordingly, sustainable mobility for the car users in this study concerns mobility options, which secures individual comfort, convenience, and individual freedom. The implications for the potential of sustainable mobility cannot be understated because this benchmark negates the essential foundation upon which sustainable mobility interventions depend – the embeddedness of sustainability values, which place a premium on integrating sustainability issues into the

national agenda on the one hand, and the investment into policy interventions that would provide access to more sustainable modes of travel on the other. Given that the horizon for mobility choices is limited to this mobility benchmark, political decision makers have little incentive to implement large-scale and costly change. Instead, they continue to promote or even expand existing car-centric systems and infrastructure. Consequently, the potential for developing sustainable mobility models in regions without developed passenger rail infrastructure in the US is caught between behaviour change that is contingent on modalities fulfilling benchmark requirements on the one hand, and the provision of alternatives that do not interrupt existing lifestyles and mobility practices on the other. This is situated within a larger mobility environment characterised by a vast, low-density landscape – something contemporary research and policy have not adequately addressed, and a considerable aversion towards raising taxes or funding public projects. The resulting stalemate – current institutional norms and values, embedded cultural practices, the lack of sustainable alternatives, as well as the impracticality of developing them, means that the most realistic solutions will depend on affordable and car-centric technological innovations that do not interfere with current lifestyles and mobility practices; in short, technologies, which do not yet exist.

Trains in the Land of the Car: A Case Study of Mobility as Agency in the United States

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Abstract

Recent studies have shown that self-efficacy—the belief that individuals are able to execute behaviours that lead to desired outcomes—is a key factor for adopting more sustainable travel modes and practices. Also crucial are societal values and policies associated with sustainability, which guide individual mobility behaviours. Thus, sustainable travel research and policies are divided into hard and soft approaches. This study applies Albert Bandura’s concept of personal agency and his model of triadic reciprocal causation (TRC) to explore mobility as agency from the perspective of 32 car users from regions, which no longer have an adequate passenger rail infrastructure. The aim is to investigate the applicability of TRC theory in a US context, as well as a substantive study of how car users make sense of their mobility practices in relation to trains. Based on hermeneutic content analysis, a mixed-method analytic framework, findings reveal that Bandura’s agentive pathways associated with individual and proxy agency define the mobility practices of interviewees. By exploring the underlying

structures of salient agentive pathways, this study traces the links between agency and (un)sustainable travel within a US American mobility culture.

Keywords: Sustainable travel, Albert Bandura, agency, model of triadic reciprocal causation (TRC), mixed methods, hermeneutic content analysis (HCA), multidimensional scaling (MDS), car users, trains, USA.

Introduction

I've heard so many times that the reason we don't have them is because we're so big. And yet, all the rest of the world has trains and they're used all the time. (12: 14)

The main aim of sustainable travel is to reduce car use and to promote more sustainable modes of transportation (Bergman & Bergman 2019; Black 2010; Ettema et al. 2013; Proost & Dender 2008). Yet, mobility interventions are contingent on the ability and willingness of individuals to adopt new behaviours. Accordingly, individuals need to value sustainable travel and embrace relevant policies (Banister, Pucher, & Lee-Gosselin 2007). To achieve sustainable travel, research and policies tend to focus on hard and soft approaches. Hard approaches emphasise structural and regulatory interventions, such as developing or improving public transport, creating bicycle infrastructure, introducing road-pricing initiatives, or providing monetary incentives (see for example Tillema, van Wee, & Ettema 2010; Arnott et al. 2014; Herring & Roy 2007; Cellina et al. 2019). These strategies aim to nudge people toward more sustainable mobility practices, which in turn are aimed at reducing car use (Skarin, Olsson, Friman, & Wästlund 2019). Soft approaches consist of cognitive-motivational interventions that target affect, beliefs, and attitudes to encourage adoption of sustainable behaviours (Cellina et al. 2019; Steg & Tertoolen 1999; Graham-Rowe, Skippon, Gardner, Abraham 2011; Chatterjee & Bonsall 2009). Self-efficacy—the belief that individuals are able to execute behaviours that lead to desired outcomes—is a significant predictor of behavioural change (Skarin et al. 2019). In line with the soft approach, interventions often focus on reinforcing beliefs aligned

with sustainable travel via group discussions, role-play, and information campaigns (Olsen, Huck, & Friman 2018; Diniz, Maria de Fátima, Peres, de Oliveira 2015; Rose 2008). In recent years, many innovative projects have capitalised on evolving sustainability values, national or local policy frameworks that prioritise environmental concerns, or high-density cities with established or expanding public transport infrastructure to implement more sustainable travel (see for example Cellina et al. 2019; Olsen et al. 2018; Olsen, Maier, & Friman 2019; Skarin et al. 2019). However, what happens in contexts where the relevant values, policies, or infrastructure associated with sustainable travel are absent or have been superseded?

The United States lags far behind other developed nations in adopting sustainability measures, such as the Kyoto Protocol and the Paris Climate Agreement (Zhang, Chao, Zheng, & Huang 2017). In large parts of the country, low-density, sprawling communities are the norm (Banister et al. 2007; de las Heras-Rosas & Herrera 2019; Urry 1999, 2004), and mobility of US Americans continues to be intertwined with private cars. Cars are synonymous with comfort (Banister et al. 2007), convenience (Banister et al. 2007; Westman et al. 2017), pleasure, freedom, satisfaction, and status (Jakobsson 2007; Steg 2005; Mokhtarian & Salomon 2001). According to Banister and colleagues (Banister et al. 2007, p. 7), the car is culturally rooted: “Free roads, free parking, cheap petrol, and universal, cheap driver licensing are widely viewed as a natural right”. Unsurprisingly, private car use continues to increase annually (Deloitte 2019), average occupancy continues to decline (OECD 2013), and as purchasing choices continue to shift toward light trucks and SUVs (Bailo 2018) it presents a formidable challenge to addressing the transport sectors’ Triple C’s—climate change, congestion, and casualties (Geerken et al. 2009; Bergman & Bergman 2019; Olsson et al. 2019). The urgency for change is widely

discussed (de las Heras-Rosas & Herrera 2019; Bergman & Bergman 2019; Urry 2004; Banister et al. 2007; Banister 2011), yet investigations examining the agency potential for sustainable travel in the US context are rare. This study explores how car users in regions without developed passenger rail infrastructure in the US make sense of their mobility practices. The aims are to explore the potential of a sophisticated theoretical framework, Bandura's triadic reciprocal causation (TRC), to make relevant contributions to the study of sustainable travel, to explore how current mobility practices connect to more sustainable alternatives in the US, and to understand how links between agency and mobility policies relate to sustainable travel.

Theoretical Background

Mobility as agency offers a conceptual framework for linking personal agency to the mobility domain (Bergman, Bergman, & Thatcher 2019; Bergman et al. 2020). According to Albert Bandura's model of triadic reciprocal causation (1986, see also 1989, 2001, 2006), individuals continuously negotiate ever changing environments because of their unique ability to "designedly conceive unique events and different novel courses of action and choose to execute one of them" (Bandura 2001, p. 5). He termed this personal agency, and the conceptual dimensions and pathways of agency according to TRC are visualised in Figure 10.

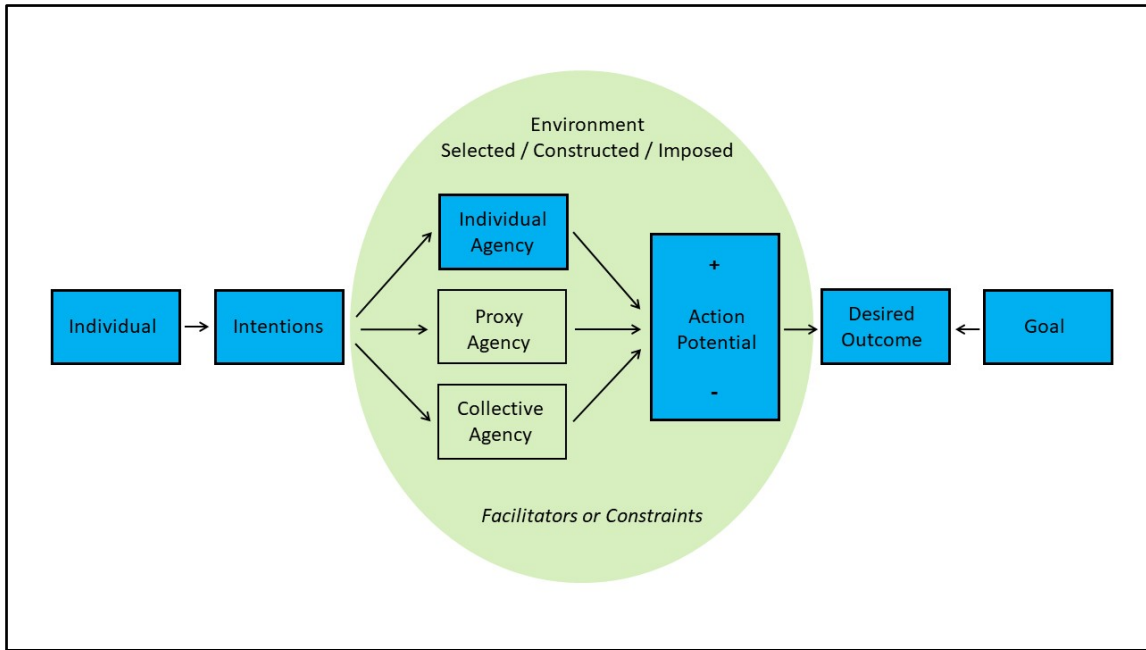


Figure 10. Personal agency according to Bandura’s Model of Triadic Reciprocal Causation.

Personal agency begins with the intentions to be mobile, which are the strategies or action plans individuals formulate to achieve a desired outcome (Bandura 2006, 2001). Because intentions form the basis of future actions towards realising a particular goal or desired outcome, intentions, goals, and desired outcomes are essentially the same but manifest at different points in time (Bandura 2006, 2001). Actions separate our intentions in the present from achieving a desired outcome or goal in the future (Bergman, Bergman, & Thatcher 2019; Bergman et al. 2020). Turning intentions into goals involves various options and considerations. Bandura proposes three distinct modes of agency: Individual, proxy, and collective. Individual agency denotes the process whereby individuals guide their own behaviour to achieve their goals (Bergman, Bergman, & Thatcher 2019; Bandura 2001). Proxy agency refers to instances where someone else assists us in achieving our goals by acting on our behalf. Collective agency refers to situations where

individuals work together to achieve their goals through interdependent effort (Bandura 2006, 2001).

Using a private car to reach a desired destination is an example of individual agency. Petitioning local government to develop public transport is an example of enlisting the help of a proxy to achieve mobility goals. Organising a lift club or carpool are examples of collective agency—mobility goals are achieved through interdependent effort. The three modes of agency are embedded in, and dependent on, a range of environmental factors, which facilitate or constrain individuals' abilities to act. Bandura distinguished between selected, constructed, and imposed environments. A selected environment is characterised by choice. Here, individuals have access to a variety of options, such as a car, bus, and train, and they select the option that enables them to achieve their desired goal. The constructed environment does not exist in the present and thus requires concerted effort to create. Examples are campaigning for the development of public transport infrastructure or creating a car-pool community. The imposed environment introduces the most restriction. Here, individuals are constrained by their environment, and their action potential is limited to choosing whether to accept, protest, or move from one environment to another (Bergman, Bergman, & Thatcher 2019; Bandura 2001). Examples are being unable to afford a car or being stuck in traffic.

Dimensions of agency and environment interact in complex ways, and they are managed through intra-personal deliberation (Bergman, Bergman, & Thatcher 2019; Bergman et al. 2020). In this process, individuals assess how environments, which are selected, constructed, or imposed, can facilitate or constrain their action potentials, and how they could utilise different modes of agency, such as individual, proxy, or collective agency,

to achieve their goal. Individuals choose the mode of agency according to their understanding of a given environment, which is believed to secure a desired outcome (Bergman, Bergman, & Thatcher 2019; Bergman et al. 2020; Bandura 2001). According to TRC, an appropriate course of action is selected and implemented based on these complex and dynamic deliberations, as “internal personal factors in the form of cognitive, affective, and biological events, behavioural patterns, and environmental influences all operate as interacting determinants that influence one another” (Bandura 2006, p. 6).

The highlighted agentic pathway in Figure 10 represents individual agency. Based on established research and the predominance of car-use in the US (Jakobsson 2007; Steg 2005; Mokhtarian & Salomon 2001; Westman et al. 2017; Urry 2004), we expect this agentic pathway to be the defining feature of mobility as agency in the US. However, how does this choice connect to agency and environment in relation to alternative modes of transport, especially trains? Specifically, two research questions guide this inquiry:

- (1) What is mobility as agency from the perspective of car users in the US?
- (2) How do trains specifically and sustainable travel more generally relate to their mobility choices?

Materials and Methods

Thirty-two narrative interviews were conducted with individuals residing in states that currently do not have a developed passenger rail infrastructure, including Arizona,

Arkansas, Indiana, Michigan, Nevada, and Texas. Like most US Americans, interviewees are highly mobile, having grown up or lived in a number of other states. The age of the men ($n = 15$) and women ranged between 19 and 78 years ($m = 38$; $sd = 19$). Interviewees occupied all socioeconomic strata and included homemakers, administrators, an artist, a construction worker, an electrician, a social worker, educators, a restaurant waiter, a bartender, an IT specialist, a soldier, security personnel, an account manager, small business owners, and retirees. While these interviewees are not representative of a larger population, the goal of this study is to assess the applicability of TRC, specifically how Bandura's concepts of agency and environment relate to US mobility contexts and culture. Interviewees were selected based on convenience or snowball sampling. Interviews were conducted immediately or at a time and place that was convenient for the researcher and interviewees. The interviews took place in cafes, restaurants, parks, university campuses, libraries, and other public places. Data were analysed using hermeneutic content analysis (HCA; Bergman 2010), a mixed-methods approach that has been employed in the fields of psychology, sociology, sustainability studies, business and management studies, business ethics and corporate sustainability, and mobility studies (Bergman, Bergman, & Thatcher 2019; Bergman et al. 2020; Bergman, Berger, Leisinger, Zhang, Liu, & Bergman 2015; Bergman, Berger, Leisinger, Bergman, Liu, & Zhang 2017; Bergman, Bergman, Fernandes, Grossrieder, & Schneider 2018). This method has also been used to study mobility in South Africa (Bergman, Bergman, & Thatcher 2019) and China (Bergman et al. 2020). HCA consists of three steps: The first, qualitative step consisted of identifying, sorting, and classifying agency and environment dimensions in accordance with Bandura's typology and as illustrated in detail in the first results section. To explore the interrelations between dimensions identified in the first step of HCA, a second, quantitative step, specifically multidimensional scaling (MDS), was performed.

The similarity matrix of the co-occurrences of the dimensions was calculated using the Jaccard Index. Of the two most frequently used indices for similarity matrices of co-occurrence data (Association Strength and Jaccard; see for example Borg, Groenen, & Mair 2012), the latter provided the most stable solution with the least amount of stress. The analysis was based on thetar (Berger *forthcoming*) and smacof (Mair et al. 2015) in R. A non-metric procedure with a primary approach to ties was used and the comparison was done at the code-level ($n = 1071$). At 0.06, stress was much lower than for a random sample, estimated at 0.22 (Spence 1979). The findings from this analysis are presented in the second results section. To improve interpretation of the MDS results, the third step of HCA consists of a re-contextualisation, where structures and patterns in the MDS map are interpreted with reference to the interview transcripts.

Results

HCA Step 1: Linking mobility as agency to mobility practices

The aim of the first analytic step was to connect Bandura's tripartite model to the mobility experiences of interviewees. This entailed identifying mobility-related vignettes in the data and their coding according to agency and environment dimensions as proposed by Bandura, which included intentions, types of agency and environments, environmental facilitators and constraints, action potentials, and desired mobility outcomes. The following is an illustrative example:

Interviewer: When you say a car is more convenient, why is that?

Interviewee: It's just, like I said, I guess not having one [a train] here, there as always just the car in the driveway as opposed to having to do something else. I guess you would have to take a car to get to where you would ride a train as well. So there are all those things, I don't know. I guess it's just more convenient to skip the train all together and take the car. Probably more costly cause you gotta pay for gas. (19: 4)

The mobility intention in this excerpt relates to convenience, but it also denotes the mobility goal because the interviewee's intended mobility choices and desired outcome are interrelated. The mode of agency is individual because agency is limited to the interviewee's own ability to act. Of the three types of environment proposed by Bandura (selected, constructed, and imposed), the lack of train infrastructure ("not having [a train] here") represents an imposed environment, while "to skip the train all together and take the car" exemplifies the ability to select the best environment. These environments link to constraints and facilitators. Not having access to a train, having to travel to the station before taking a train, and the costs associated with using a private car are examples of environmental constraints that contribute to a negative action potential. Always having a car in the driveway is exemplary of an environmental facilitator that supports a positive action potential, which enables the interviewee to achieve a desired outcome: To maximise convenience.

The agency and environment dimensions in the excerpt illustrate mobility as agency and exemplify the suitability of TRC as a theoretical framework. Overall, an analysis of 1071 mobility vignettes in the interviews revealed the following: First, the agency and

environment dimensions as proposed in TRC adequately accounted for the mobility experiences of interviewees. Second, mobility experiences could be differentiated between individual, proxy, and collective modes of agency. Of these, individual and proxy agency dominated, while collective agency was only mentioned 12 times. When it occurred among the 1071 vignettes, it did not connect well to TRC because the collective in the data referred to shared experiences with family or friends while enjoying a train journey (especially touristic steam trains) or experiences in the interviewees' childhood. Thus, it could be argued that collective agency in Bandura's sense did not occur in the data. Finally, the two dominant dimensions of agency interconnected with the three dimensions of environment, representing complex, intra-personal deliberations as individuals assessed how various environments facilitated or constrained their potential to act, and how activating different modes of agency could help achieve desired mobility goals. The next analytic step examined how agentic pathways unfold across environments in the US mobility context.

HCA Step 2: Mapping Agentic Pathways

Multidimensional scaling (MDS) was used to map the relations between agency and environment dimensions as identified in step 1. Based on how frequently dimensions co-occur in the interviews, MDS visualises the relationships in an n-dimensional space. In this step, the collective dimension was excluded on theoretical and methodological grounds because, as stated above, it was rarely mentioned by interviewees and because it did not match TRC's conceptualisation of collective agency. In accordance with Bandura's tripartite model, the action potential and desired outcomes were divided into their positive and negative constituents ('action potential positive' and 'action potential

negative’, and ‘desired outcome achieved’ and ‘desired outcome impeded’). The corresponding MDS map is presented below.

Figure 11 is an MDS map of mobility as agency from the perspectives of the interviewees. Each point in the map represents one of the dimensions associated with agency and environment as proposed by TRC. The distance between points represents the frequency with which dimensions co-occur in the interview data. The closer points are situated to one another in the MDS map, the more frequently the corresponding dimensions co-occur in the narratives, and the further apart the points, the less likely the dimensions co-occur. For example, the dimensions ‘desired outcomes impeded’ and ‘negative action potential’ located in the centre of the cluster on the left are in close proximity, which means that the corresponding dimensions frequently related to one another in the narratives of interviewees. In contrast, the dimensions ‘constructed environment’, located at the top of the cluster on the left, and ‘individual agency’, located at the bottom of the cluster on the right, are maximally distant to one another, indicating that they rarely co-occurred in the narratives. The lines between points illustrate how dimensions cluster together. The line represents links between the most frequently co-occurring dimensions. The clustering of dimensions in MDS are interpretable and provide insight into the conceptual space of interviewees in ways that would not be possible through a qualitative analysis.

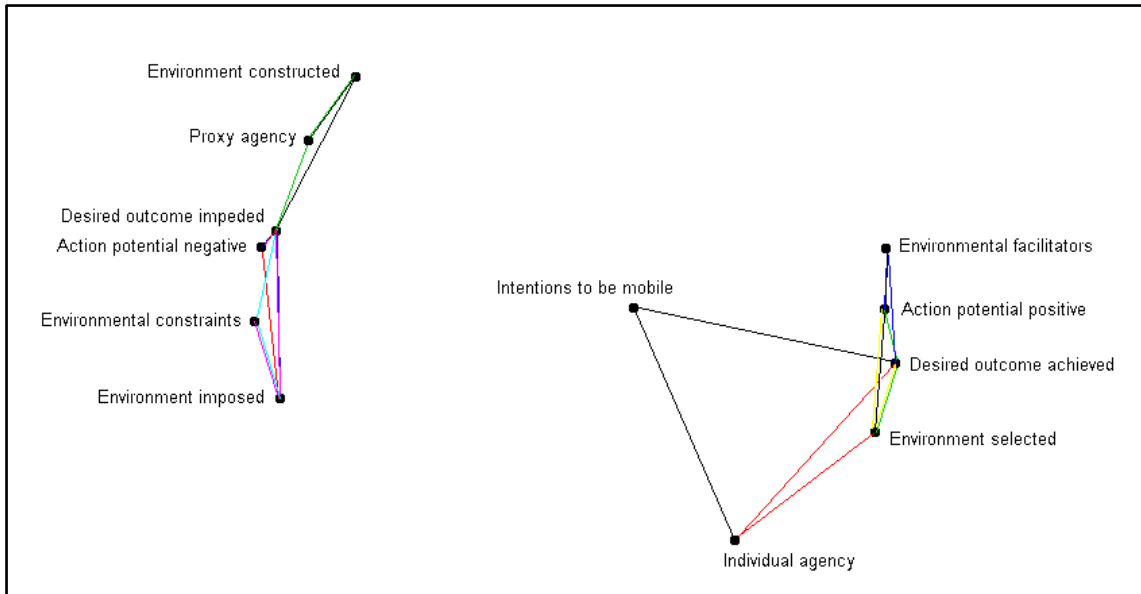


Figure 11. Multidimensional scaling (MDS) map of the agentic practices of car users in the US. Code-level comparison, $n = 1\,071$, model parameters: A non-metric procedure, primary approach to ties, stress = 0.06. The colours in the map indicate the pair of themes each theme most frequently co-occurs with and helps to illustrate more clearly how themes cluster together.

According to the MDS map, the TRC dimensions identified in step 1 form two distinct clusters, located on the left and right. The cluster on the left contains ‘imposed environment’, ‘environmental constraints’, ‘negative action potential’, ‘impeded desired outcome’, ‘proxy agency’, and ‘constructed environment’. Two noteworthy characteristics define this cluster. First, it contains all negative dimensions associated with mobility: An imposed environment constrains the action potential of individuals to the extent that they are unable to achieve their desired mobility goals. Second, the negative dimensions are associated with proxy agency and a constructed environment: It is a proxy agent’s failure to construct a viable environment that results in negative mobility outcomes. This agentic pathway represents the breakdown of mobility as the

proxy imposes limits on the mobility environment, which results in a negative action potential and unattained mobility goals.

The cluster on the right contains the dimensions ‘individual agency’, ‘selecting an environment’, ‘desired outcome achieved’, ‘facilitating environment’, ‘positive action potential’, as well as ‘intentions to be mobile’. In contrast to the cluster on the left, this cluster contains all positive dimensions associated with mobility: The ability to select between different mobility environments facilitates a positive action potential that helps secure desired mobility outcomes. The overall positivity of the cluster is associated with individual agency. This configuration indicates that mobility associated with individual agency consists of an agentive pathway, where interviewees are able to select between different mobility options to facilitate their mobility potential and desired mobility goals.

The central position of the dimension ‘intentions to be mobile’ in the MDS map indicates that it shares important relations with both clusters. In a sense, ‘intentions to be mobile’ forms a bridge between the positive individual and negative proxy pathway. The link to the individual agentive pathway represents the successful transition from mobility intentions to desired goals. The proximity between ‘intentions to be mobile’ and the negative proxy cluster on the left indicates that mobility intentions remain present but are unfulfilled by the proxy.

The final step of the analysis connects agentive pathways, as identified in the MDS map, to the narratives on the mobility experiences of interviewees.

HCA Step 3: Mobility as Agency from the Perspective of Car Users in the US

The proxy agentive pathway: A re-contextualisation analysis of the mobility vignettes revealed that the proxy was mainly associated with the local and federal government, and that mobility references associated with government predominantly connected to passenger trains. Interviewees referred to either a lack of political will or public need to construct rail infrastructure in the areas where they live. This is due in part to trains being viewed as expensive and unprofitable, and government as inefficient and uninterested in investing into mobility infrastructure that would primarily benefit the poor, the elderly, or families. Here are some examples:

I keep hoping that they start laying more track. It's so damned political. When the West opened up, the land was here for the taking. It wasn't owned by anyone. So the railroads had their way of finding the easiest routes, but now it's a little more complex. I wish the government would get involved in this. Whether they, whatever they need to do, I think we need more railroads. (2: 1)

But because our city doesn't wanna bend. So you know, some people just don't wanna do what's best for a lot of people. (20: 2)

Yeah but it's like the rest, you know the train system is just a reflection of the rest of our infrastructure. Talk about it, talk about it, but never put enough money or time into it, you know. (7: 7)

The individual agentive pathway: The mobility vignettes associated with the individual agentive pathway predominantly concerned mobility expectations of individuals' daily mobility practices. Mobility expectations comprise three components: Convenience, comfort, and freedom of movement. Convenience is associated with speed, flexibility, and affordability. Whatever the mode of transport, it should be fast and reach the intended destination within the shortest possible time. Mobility modes should be flexible, which means that they ought to work around the individual and their family's needs and activities including shopping, errands, and work and leisure. They should accommodate not only unique situations and lifestyles, but also momentary changes of plan. Finally, mobility modes should be cheap.

Beyond expectations of safety, comfort refers to access to wifi, food, entertainment, and beautiful scenery. Comfort is furthermore associated with personal space: Many interviewees place a premium on privacy to 'do whatever they want', listen to music as loudly as they like, and 'get in the zone'. They specifically dislike being in crowded places, or having to deal with negative, aggressive, or annoying people. In other words, a train journey should mimic as closely as possible the comfort, flexibility, and privacy of an idealised car journey—devoid of traffic jams, bad weather, or unwanted company. Freedom of movement was mentioned most frequently. It denotes the ability to "go wherever you want, whenever you want" (18: 11), a phrase mentioned nearly verbatim by many. It represents at its core a desire for independence, spontaneity, immediacy, and individualism. Here are some examples:

So I would definitely not, no, I'm enough of an American that I would not give this up. I love the freedom. Like today, if I wanna go to town, I can. If I wanna go

to Austin today, I can. It takes me twenty minutes to get everything together and go. (12: 8)

Interviewer: You mentioned earlier that you like to look at [trains] when they go by.

Interviewee: Yes, they fascinate me. You think of this idea of freedom. But in reality you lose your freedom. So there's a conflict. Maybe it's the possibility of freedom. You know, maybe it's the wrong word, freedom. Maybe it's adventure or wanderlust rather than freedom because this [she points to her vehicle] represents freedom. I can go wherever I like. And as long as I can afford the gas, I can go. (11: 8)

Intentions relating to convenience, comfort, and freedom of movement: Convenience, comfort, and freedom of movement form the basis for mobility expectations. It defines interviewees' intentions to be mobile and guides the strategies they use to select mobility options. Private car use becomes the paragon of mobility practices. It enables interviewees to do what they want, when they want, in exactly the way they want. This benchmark constitutes the expectations interviewees have of the role of the government. According to them, government would have the resources to prioritise the development of public transport infrastructure, and the government ought to provide convenient, fast, comfortable, easy-to-use, and cheap public transport. Here are two examples:

I think they should make it more accessible to people to be able to take trains. At the very least to make it more accessible for people to take it from city to city. I know you can't have a station in every little town, but I mean like College Station

to San Antonio or to Dallas. Like I feel like that would be a lot better. That would be a lot more beneficial to people too because not everybody has a car and some people are just not gonna get on a plane. So I feel like that would be, give them—a lot of people a better option and give a lot of people like a better way to stay connected too. Yeah, so I definitely think it's a good idea to try to bring trains back. (11: 6)

...infrastructure maintenance you know that there are train systems and that they're kept up. That they are kept clean, that they're kept safe, that they're kept comfortable. Those things, but you know, again, of course they have to be affordable and now I am asking the impossible. I just don't see it any other way you know. I don't see a minimalist service that is not safe or clean. I don't see that working and I don't see a train system working that has all these wonderful things that is very expensive—working so it's some kind of magic. A magic compromise that maybe train decision makers have to work on. This magic, how to make this magic work? (28: 18)

On the one hand, the above excerpts illustrate how interviewees use their mobility benchmark to evaluate other modes of transportation. Essentially, interviewees would like to transpose all the comfort, convenience, and freedom in their private cars onto trains. On the other hand, they consider it the government's responsibility to create a mobility environment, which includes comfort, convenience, and freedom across multiple mobility modes. Where does this benchmark of mobility expectations come from, and why is the maintenance of this benchmark the responsibility of the government? This final excerpt traces the origins and perpetuation of such mobility expectations:

I think it goes back to the 50s and earlier, cause it wasn't until the late 40s, early 50s that I remember a lot of people having cars. You know, during the war you couldn't get a car. Basically, before that, during the depression, a lot of people couldn't afford it, and in the 50s, you know, Eisenhower started to build the interstate system, made travelling throughout the country easier. The car companies came out with reasonably priced, nice cars that the average family could afford, and everybody found that freedom of movement. (7: 9)

Historically the government created a mobility environment that enabled convenience, comfort, and freedom of movement to serve an increasingly individualistic and consumer-oriented society. In the process, it also created the most formidable economy in the world. Over time and through institutionalisation, individuals appropriated this benchmark: To own the freedom of movement, which maximises individual expressions of taste and lifestyle, as well as personal comfort and convenience. Convenience, comfort, and freedom became the quintessential cultural markers in the US, including and transcending individual mobility practices.

Discussion and Conclusions

The aims of this study were to explore the potential of TRC as a theoretical framework for studying the links between agency and mobility practices, to make a relevant contribution to the study of sustainable travel, to explore how current mobility practices connect to more sustainable alternatives in the US, and to understand how links between

agency and mobility policies relate to sustainable travel. Mobility as agency constitutes two distinct agentive pathways: One connected negatively to a proxy and the other connected positively to individual agency. Interestingly, collective agency as proposed by TRC is largely absent among US car users. The government as a proxy agent is ostensibly incapable or unwilling to invest in appropriate public transport infrastructure, which imposes limits to the US mobility environment. Many participants are critical of the government's failure to develop mobility infrastructure that would benefit either themselves or, to a limited extent, society. The latter is synonymous with the poor, the elderly, and families.

The failure of agency derived from the proxy contrasts with the positivity of individual agency as associated with individual expectations, goals, and practices. Here, individual agency is embedded in encultured mobility expectations—comfort, convenience, and freedom, which guide interviewees' assessment of and selection between different mobility modes. This benchmark ostensibly enables individuals to 'do what they want, when they want, in exactly the way they want'.

The primary contribution of this study relates to how this benchmark defines individual and proxy agency in relation to mobility as agency. The horizon of mobility choices and their practice is limited by comfort, convenience, and freedom. Just as collective agency did not feature in how interviewees conceptualise mobility as agency, so is sustainability or sustainable travel absent in daily mobility thought and practices because both would fail the benchmark assessment. Instead, the mobility domain is constrained by mobility modes which best secure or exceed benchmark expectations: Does a possible mobility alternative improve on the convenience, comfort, and freedom of an idealised car

journey? The role of the government is limited in that it is relegated to the development, provision, and maintenance of a mobility environment that aligns with this benchmark. The failure of the government is not the inability to provide access to passenger trains, but a failure to extend the mobility benchmark to other modes of transport. According to this logic, the potential for behaviour change to more sustainable practices are conditional on the basis that (a) modalities fulfil these benchmark requirements and (b) the government provides alternative mobility modes to individuals without interrupting lifestyles and at no extra cost. In the present and near future, trains in the US are understood as an occasional travel alternative, not a replacement of cars. This has profound implications on the potential for sustainable travel, which is dependent on the societal embeddedness of sustainability values on the one hand, and policy interventions to implement sustainable travel on the other. While interviewees apparently desired access to trains, the support for extending public transport infrastructure is expected to conform to benchmark expectations. The consequences on designing soft approaches to change mobility behaviour in this context are significant. While most studies have emphasised reinforcing or aligning beliefs and values with sustainable travel through group discussion, role-play, and information campaigns (Olsson et al. 2018; Diniz et al. 2015; Rose 2008), the findings indicate that sustainability values will be subordinated to benchmark expectations for the near future. Hard approaches such as developing public transport infrastructure that fulfil the prevalent benchmark become a prerequisite for change in the mobility domain. This context encourages especially elected decision makers to continue investing in existing, car-centric infrastructure, and a disincentive to explore sustainable alternatives. But even if sustainable travel enjoyed greater public and political support, the vast, low-density landscape in the US presents a formidable challenge to develop large-scale public transport infrastructure. Of course, the same could

be said about China, the current world champion in public transport infrastructure development, but its historical and cultural roots are very different, as are the position on a socioeconomic development trajectory, public expectations, and governance model. The question of how to make mobility in the US context sustainable is something that research and policy have not addressed adequately. For now, the most feasible solutions depend on technological innovation that do not interfere with predominant travel preferences, identity markers, or lifestyles of US Americans (Banister et al. 2007), nudging models that do not enjoy public or political support, or information campaigns that seem ineffective for now. The absence of more sustainable alternatives, the disincentives against developing them, and the presence of existing institutionalised norms and values create a stalemate.

In some sense, the current divisive political landscape in the US reflects on a grand scale what is observed in a microcosm. A conflict wherein the old untenable and unsustainable world imposes its values and rules on a new world that, still nameless and shapeless, is becoming more present with each political and climate emergency. Faced with rapid economic, social, political, and environmental changes, politics and society retreat into familiar comforts. For the car users who participated in this study, addiction to comfort, convenience, and an imagined sense of freedom limits their ability to reimagine lifestyles and consumption. Thus, even when asked about an imagined, ideal future, their addictions define mobility along the contours of the past 70 years. Yet, finite resources, the increasing frequency and significance of climatic events, and its consequences require significant adaptation from individuals and societies. The world must find ways to travel more sustainably, and, for better or worse, the US will continue to play a disproportionate role in the 21st century.

The notion of the China Dream is a clever negotiation between collective identity and individual aspirations. It is rather a large body of water – the dream reveals the Chinese people as having a collective will and identity shaped by a difficult history but at the same time if individuals and communities look closely into the dream they should be able to see their own reflection in it.

(David Kerr 2015, p. 2)

CHAPTER FOUR

Mobility as agency from the perspectives of train users from Beijing, China

Introduction

One of the most ambitious and wide-ranging, large-scale science and technology transformations in China has been the development of the world's largest and most advanced rail system. Essential to socio-economic development, it is widely regarded as safe, efficient, smart, and environmentally friendly (Aglietta & Bai 2016; Bräutigam & Tang 2014). While this system contributes significantly to the goals of sustainable mobility, scholars have pointed out the disruptive potential of new technologies generally, and technologies associated with mobility in particular. According to them, existing cultural practices are negatively impacted by the rapid transformations such large-scale technological development introduces (Bandura 2001; Christensen, Raynor, & McDonald 2015; Fukuyama 2000; McGrath 2013; Reville 2012; Schivelbusch 1979; Zuboff 1989, 2015). In China, for example, increasing access to mobility options ostensibly makes people less dependent on local opportunities and family networks, which in turn poses a direct challenge to collective efficacy (Bergman et al. 2020; Bandura 2001, 2002; Holton 2019; Grieco & Urry 2016). In this way, technological transformations disrupt the mutual constitution between culture and individuals by promoting autonomy and self-determination – values that are inconsistent with

collectivist and Confucian traditions (Low 2011; Sung 2000; Tu 1996, 1998; Wei 2013). Consequently, China’s mobility turn, while intended to serve the common good, may inadvertently undermine the collectivistic foundations of Chinese society (Bandura 2001, 2002; Holton 2019; Grieco & Urry 2016).

If this is indeed the case, then we could expect that mobility as agency for train users from Beijing to transform from a traditional collective agentive pathway, illustrated in Figure 12 below, to an individual pathway.

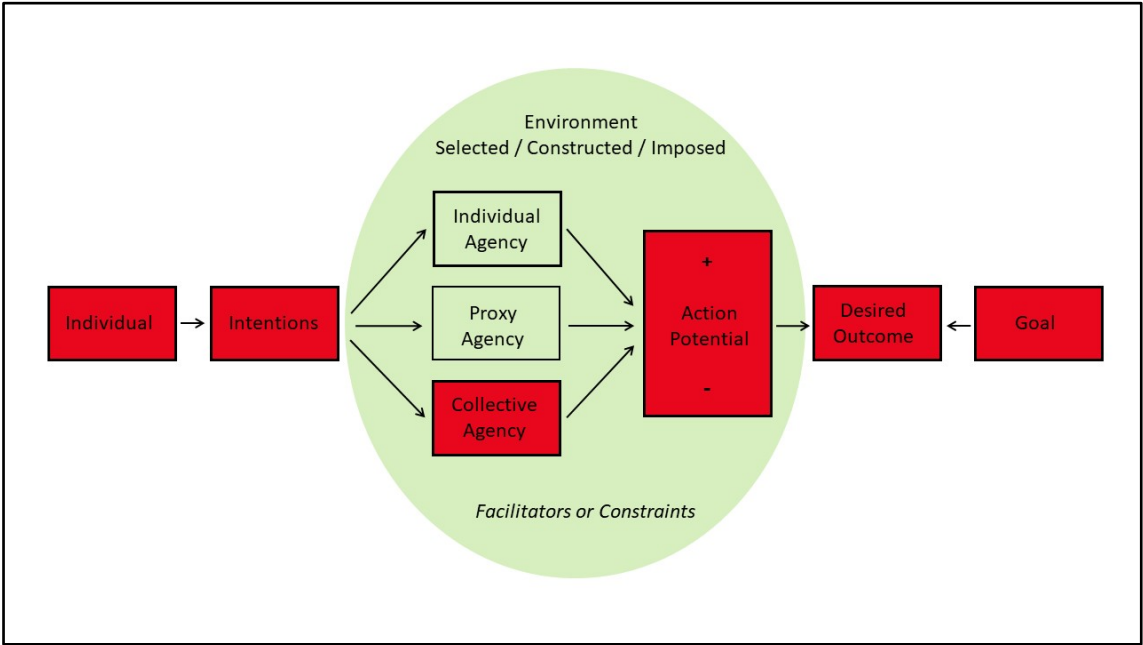


Figure 12. Mobility as agency of train users in Beijing based on collectivistic and Confucian traditions.

Given the lack of empirical studies on the cultural consequences of technological transformations more generally and the mobility turn in China specifically, we do not know if this is the case. The purpose of this study is to examine the disruptive nature of

mobility technologies more systematically by investigating how 31 regular train users from Beijing experience and practice train mobility in relation to their national ideology, culture, and traditions. The concept of mobility as agency is especially suited for this, given that it can trace various agentive pathways and their connection to specific environments in individual mobility practices.

An analysis of the perspectives and practices of train users in Beijing shows that while all three modes of agency are evident in their mobility narratives, only one, proxy agency, is an explicit pathway. Individual agency is the most restricted, limited to descriptions of mobility options, possibilities, and preferences. Although present, these are not part of the predominant representation of mobility as agency. Instead, mobility as agency consists of a much larger collective that transcends the individual and encompasses social groups, including the elderly, the poor, the uneducated, and migrant workers. It connects to mobility experiences, aspirations, and desires that are shared through a perceived collectivistic mindset and collective developmental destiny. This mindset is defined by tolerance, harmony, and solidarity, in which individual needs are subordinated to those of the collective (Bergman, Bergman, & Thatcher 2019). Success is attributed to collective or proxy agents and failures to individual shortcomings or temporary system glitches. Possibly the most surprising finding is the extent to which these collective experiences, practices, aspirations, and shared destinies are tied to the role of the proxy, the Chinese government. In this role, the government is portrayed as an accountable administrator, charged with the responsibility of designing, implementing, and fostering the positive socioeconomic developmental trajectory of modern China. By implementing large-scale technological transformations in the mobility domain, the government delivers direct socioeconomic benefits to society. In doing so, it utilises mobility

technology to advance the dream of “Chinese socialism” (中国特色社会主义) and to develop an inclusive and “moderately prosperous society”. As the only one assigned with an explicit agentive pathway, the proxy is expected to take charge of societal development and the destiny of the nation in the present and well into the future. The successful performance of the government generates substantial national pride among respondents and, consequently, the mobility turn becomes the foundation for a positive feedback loop, which, instead of disrupting established sociocultural practices, maintains and fosters the existing sociocultural model and governance structure in China. Through the careful administration of this mobility potential (Bærenholdt 2013; Doughty & Murray 2016), the government uses mobility not as a mere tool for corporeal travel but a mechanism to construct national culture (Jensen 2009). Based on these findings, mobility as agency can be adapted and illustrated in Figure 13 as follows:

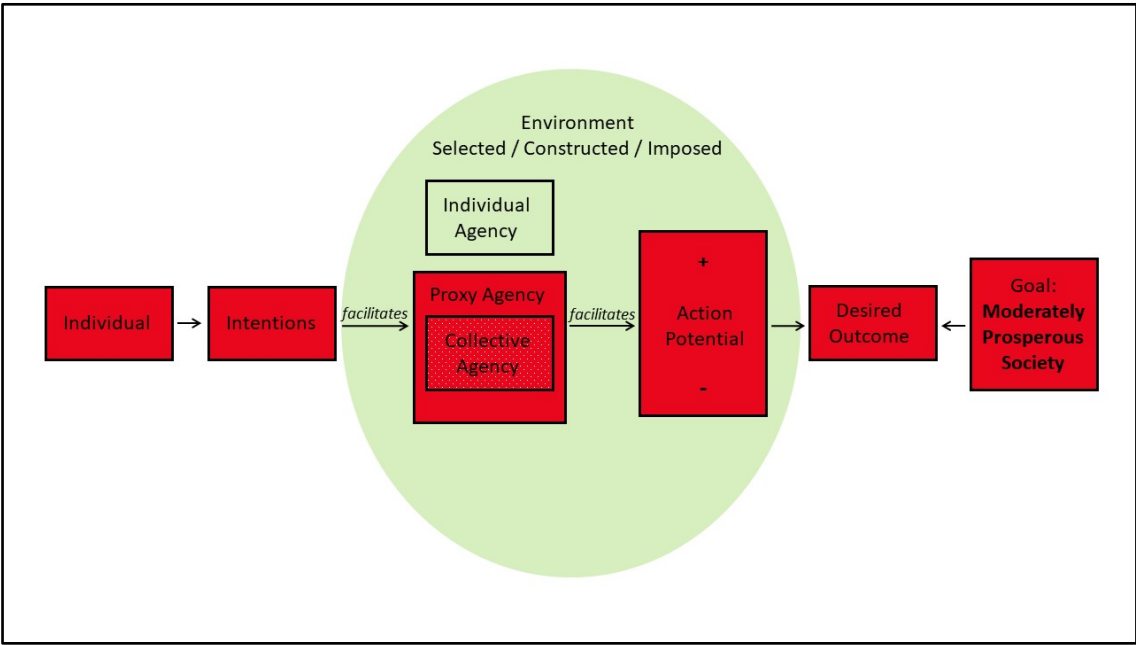


Figure 13. Mobility as agency of from the perspectives of train users living in Beijing.

There are important lessons that can be drawn from these findings, leaving aside more general debates on preferred normative positions toward ideological systems. As scholars, we often situate mobility turns and technological transformations outside of cultural practices. By claiming that they ‘produce culture’ (Jensen 2009), we reduce this dynamic and complex interaction to unidirectional, oppositional dichotomies such as traditional vs. modern, disruption vs. continuation, collectivist vs. individualist, mobility vs. immobility, or success vs. failure (Sheller 2011; Grieco & Urry 2016; Hannam, Sheller, & Urry 2006; Holton 2019; Sheller & Urry 2006; Tyfield 2014; Urry 2002). In assuming that mobility transformations impact, disrupt, or change cultures, we tend to conceptualise inequality, marginalisation, and exclusion as typical outcomes of sociotechnical transformations. This study, however, suggests that mobility turns may, based on existing sociocultural models, offer the potential to foster dynamics of integration and inclusion (Bergman et al. 2020). If mobility theory and policy could use this as a point of departure, mobility interventions would be able to integrate the mutual constitution between a mobility turn, culture, and (subjectively perceived) development. Then, technological transformations to introduce large-scale sustainable mobility infrastructure does not seem to depend on a question of how changes in the mobility domain will impact on or disrupt people’s cultural practices, but rather how changes in the mobility domain can be utilised to foster society and its sustainable development. According to this approach:

“[S]ustainable mobility is not a utopian ideal but all of these: a tangible, negotiated, and socioculturally constructed goal. In China, mobility technologies associated with the spatial displacement of people, goods, technologies, information, or data are in congruence with economic and social concerns, and

they are in line with prevailing or anticipated contexts, cultural developments, systemic capabilities, and state ideology.”

(Bergman et al. 2020, p. 476)

Technological change and sociocultural models in China: A case study of train users living in Beijing

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Abstract

China's mobility turn has created the worlds' largest public rail system, offering its citizens considerable economic, social, and spatial mobility. Concurrently, this technological transformation has introduced many opportunities for individuation, which could potentially challenge the collectivistic and Confucian foundations of China's sociocultural ideology. While the notion 'mobility produces culture' is readily accepted, studies on train mobility in China are rare. Based on Albert Bandura's model of Triadic Reciprocal Causation to conceptualise mobility as agency, we employ Hermeneutic Content Analysis, a mixed methods framework, to study how this rapidly evolving mobility environment connects to the lives of 31 regular train users living in Beijing. Studying agency in China enables us to systematise sociocultural models within which mobility practices are embedded and how they manifest. We find that our interviewees embed agentive practices in a cultural model that is intertwined with collectivistic

aspirations of the country. Technological advancement is thus integrated into existing sociocultural models, contradicting existing debates on the fracturing impact of disruptive technologies.

Keywords: Train mobility, sociocultural models, Albert Bandura, agency, Triadic Reciprocal Causation, mixed methods, Hermeneutic Content Analysis (HCA), Content Configuration Analysis (CCA), Multidimensional Scaling (MDS), train users, Beijing, China.

Introduction

China has launched several large-scale science and technology transformations to catalyse its socioeconomic development. An essential component of this has been the modernisation and expansion of its nearly 150-year-old rail system. China has the largest one of the most advanced rail system in the world, reaching across more than 127,000 km (NBS 2019), and high-speed rail (HSR), first introduced in 2007, maintains speeds between 250 and 350 km/h on more than 31,000 km of dedicated lines (UIC 2019). Mobility systems judged as safe, efficient, smart, and environmentally friendly have become an essential building block for developing a prosperous society (PRC 2016; see also Aglietta & Bai 2016; Bräutigam & Tang 2014). Accordingly, businesses and the public have profited considerably from these developments as increased access to relatively affordable mobility reduces travel times, improves market access, fosters geospatial and social networks, and enhances economic productivity (Chen, Xu, Rose & Haynes 2016; He, Mol, Zhang & Lu 2015; Wang, Li, Xu & Zhang 2014; Wu, Xu & Lew 2015; Yang et al. 2018). The vast rail network forms a lifeline, connecting rural regions and manufacturing sites with urban centres, and geographically scattered family members with their home regions, local traditions, and friendship networks. This is exemplified by the largest human migration annually, when people return home to be with their families and friends for the annual Spring Festival. Of the estimated three billion journeys for the 2019 Spring Festival celebrations, 413 million Chinese travelled by train (South China Morning Post 2019; Xinhua News 2019). This spatial mobility and its facilitating infrastructure illustrates how China has embraced modernity, synonymous with economic

utility, social adaptation, and successful navigation of the global world (Faist 2013; for reviews on China's ascent, see Bergman et al. 2015; Bell 2010; Zheng 2013).

While the socioeconomic benefits of the mobility turn are well documented, less researched is its impact on cultural practices. Historical and contemporary studies, largely focused on developed economies, indicate that rapid, large-scale mobility transformations pose significant risks to established cultural practices (Bandura 2001; Christensen, Raynor, & McDonald 2015; Fukuyama 2000; McGrath 2013; Revill 2012; Schivelbusch 1979; Zuboff 1989, 2015) because evolving mobility practices redefine how we live, work, and interact (Bergman & Bergman 2019; Sheller & Urry 2016). It could be argued that an increase in spatial mobility promotes autonomy and self-determination of individuals or a collective by undermining the sociocultural, economic, and political structures that have been established in a socio-geographic space. How has a massive mobility expansion affected China and its people, who are traditionally shaped by collectivism and Confucianism (Low 2011; Sung 2000; Tu 1996, 1998; Wei 2013)? These traditions, although continuously evolving, span dynasties, revolutions, and modernisation campaigns. They emphasise societal norms, such as tolerance, trustworthiness, solidarity, and aspirations to maintain harmonious relations with others (Bell 2008; Bergman et al. 2015; Hofstede 2001; Michailova & Hutchings 2006). As the custodian of Chinese collectivism, the Chinese Communist Party (CCP) manages and maintains this national ideology. Under the stewardship of President Xi, the CCP cultivates 'socialism with Chinese characteristics' ("中国特色社会主义") to promote policies, which advance the social and economic prosperity of the collective, but that concurrently align with national pride, in-group solidarity, and nationalism (Bell 2008; Bergman et al. 2015; Zhao 1998; Zhao 2005). These notions are largely reciprocated by

most citizens as they embrace a strong national identity, heightened group attachment (Bockover 2010; Tan 2015; Tu 1996, 1998; Gries 2005), and policies that serve the interests of the collective over the individual (Bockover 2010; Tan 2015; Tu 1996, 1998; Michailova & Hutchings 2006; Wei 2013). Thus, established sociocultural practices and a traditional order may clash with disruptions associated with large-scale mobility transformations. For example, scholars suggest that an increased access to mobility options introduces an unprecedented scope for individuation and, as people become less reliant on local opportunities and family or communal networks, it poses a direct challenge to collective efficacy (Bandura 2001, 2002; Holton 2019; Grieco & Urry 2016). By fostering individualistic aspirations and behaviours, large-scale technological innovation in the rail sector inadvertently disrupt existing cultural norms, values, and traditions, thus undermining the dominant sociocultural model (Bell 2008; Bergman et al. 2015). While the mobility turn in China ostensibly serves the common good, it may inadvertently undermine the collectivistic foundations upon which Chinese society is built (Bandura 2001; Fukuyama 2000; Steele & Lynch 2013; Wan, Williamson & Yin 2015; Wu, Xu, & Lew 2015).

Two problems are associated with Jensen's declaration that "mobility is movement that produces cultures" (Jensen 2009): First, it reduces the consequences of mobility into oppositional dichotomies (traditional vs modern, disruption vs continuation, collectivist vs individualist, mobility vs immobility, success vs failure), although sociotechnical transformations in the mobility domain may alter mobility practices in far more dynamic and complex ways (Sheller 2011; Grieco & Urry 2016; Hannam, Sheller, & Urry 2006; Holton 2019; Sheller & Urry 2006; Tyfield 2014; Urry 2002). Second, the lack of empirical studies examining the disruptive potential of mobility turns on cultural

traditions and practices, especially in collectivist societies such as China, make it difficult to determine what these interactions or their consequences are. In this study, we investigate how regular rail users from Beijing orchestrate potentially disruptive mobility technologies and practices within their national ideology and traditions.

Theoretical Background

Mobility as agency offers a conceptual framework for agency and its association with the mobility domain (Bergman 2019; Bergman, Bergman, & Thatcher 2019). It draws on Albert Bandura's notion of personal agency and his model of Triadic Reciprocal Causation (1986, see also 1989, 2001, 2006). According to Bandura, people continuously encounter multiple and constantly changing environments, offering a vast array of behavioural choices. Despite the array of options, people manage to negotiate a highly complex world because, as individuals, they are able to “designedly conceive unique events and different novel courses of action and choose to execute one of them” (Bandura 2001, p. 5); this is termed personal agency. The figure below illustrates the process of how agency unfolds according to its conceptual parts:

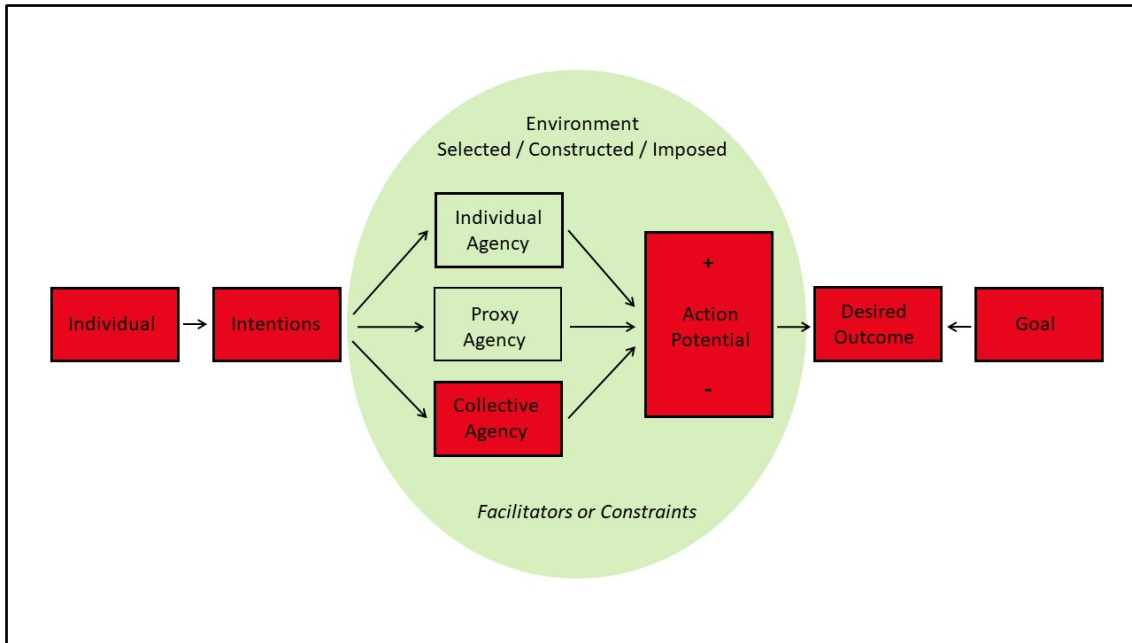


Figure 14. Model of Bandura's personal agency and Triadic Reciprocal Causation.

Intentions to be mobile refers to the strategies or action plans individuals formulate to bring about a *desired outcome* (Bandura 2006, 2001). Our *intentions* form the basis of future actions, thus preceding behaviour towards realising a particular *goal* (Bandura 2006, 2001). In this way, desires to achieve a particular mobility *outcome* serves as the impetus as well as the intended outcome of our actions (Bergman, Bergman, & Thatcher 2019). Turning *intentions* into *goals* involve a number of options and considerations. In terms of options, Bandura proposes that we have at our disposal three distinct modes of agency: *individual*, *proxy*, and *collective*. *Individual agency* concerns the process whereby individuals guide their own behaviour to achieve their *goals*. *Proxy agency* pertains to instances where someone else acts on our behalf to assist us in achieving our *goals*, and *collective agency* refers to situations where individuals achieve their *goals* by through collaboration (Bandura 2006, 2001).

A student from Beijing purchasing a train ticket from his allowance to travel to his home province for the Spring Festival is akin to *individual agency*. A migrant worker picking tea in the remote mountains of Yunnan province, in contrast, may depend on an employer to arrange for transport to a train station, many hours of treacherous roads away from the plantation. Getting this employer to arrange for such transportation represents *proxy agency*. Finally, workers from the same home community may pool their money in Yiwu to hire a car and drive home to their village near Lhasa, more than 4000km away. This interdependent effort exemplifies *collective agency*.

A range of environmental factors *facilitate* or *constrain* individuals' ability to act. Bandura distinguished between *selected*, *constructed*, and *imposed environments*. In the mobility domain, a *selected environment* may pertain to situations where an individual has access to a variety of mobility options, such as a car, bus, and train. She may opt for the option which best enables her to reach her desired *goal*. The *constructed environment* requires concerted effort to be created. Arranging for transport or renting a vehicle from pooled resources represent mobility options in a *constructed environment*. The *imposed environment* is the most restrictive because individuals are unable to change it themselves, such as when a train is severely overcrowded or delayed, or when tickets are sold out. These situations place extreme restrictions on individuals' *action potential*, but they may still choose how to respond by accepting, protesting, or changing environments (Bandura 2006; Bergman 2019; Bergman, Bergman, & Thatcher 2019).

Mobility as agency entails a complex interweaving of intra-personal deliberation as individuals assess how various environments (*selected*, *constructed*, or *imposed*) *facilitate* or *constrain action potentials*, as well as how different modes of agency

(*individual, proxy, or collective*) may enable them to achieve their *goal*. Based on deliberations within environments, individuals choose the mode of agency (*individual, proxy, or collective*) that, based on their consideration, will most likely secure a *desired outcome* in a specific context. An appropriate course of action is then selected and implemented as individuals adjust their behaviour and act accordingly. Implied in these dimensions is a complex and dynamic process as “internal personal factors in the form of cognitive, affective, and biological events, behavioural patterns, and environmental influences all operate as interacting determinants that influence one another” (Bandura 2006, p. 6). Bandura termed this the Model of Triadic Reciprocal Causation.

The agentic pathway highlighted in **BOLD** in figure 14 represents *collective agency*. Extrapolating from the literature on collectivism in China, we would expect this pathway to dominate the mobility discourse among Chinese train users, and we would also expect that large-scale technological innovations in mobility technologies in China represent disruptions to *collective agency* and *goals*. The *individual* agentic pathway could be considered the pathway promoted by technological disruption. Accordingly, the concept of mobility as agency lends itself to studying agentic pathways in China, specifically how technological transformations in the mobility domain connect to sociocultural models in China. More specifically, we explore the disruptive potential of mobility technology across agentic pathways and environments among Chinese train users living in Beijing. Three research questions frame our study:

1. Are the agency and environment dimensions as outlined in Bandura’s Triadic Reciprocal Causation model present in the narratives of train users living in Beijing?

2. How do these dimensions interrelate with the reported mobility practices?
3. How do these dimensions and interrelations connect to China's sociocultural model?

Methods

Sample: This study is based on 31 narrative interviews with Chinese train users living in Beijing. The selection criteria included geographical location (minimum of 5 years residence in Beijing), mobility type (trains), and frequency (regular train use). The interviewed men (n=15) and women (n=16) ranged in age from 18 to 61 years, represent a variety of occupational strata (unemployed, students, teachers, restaurant waiters, shop attendants, cleaners, bus drivers, graphic designers, software developers, mechanics, cooks, and office clerks). While the data is not representative of a larger population, the goal of this study was to explore the complex interactions between agency and environment dimensions according to the model of Triadic Reciprocal Causation in the context of train users. Participants were recruited in and near train stations, and the interviews were conducted in Mandarin or English, using exploratory and semi-structured questions. During a pilot phase, the interview schedule was tested and refined in Beijing.

Analysis: Data were analysed using Hermeneutic Content Analysis (HCA; Bergman 2010), a three-step mixed methods approach. In the first step, we analysed the interviews using Content Configuration Analysis (CCA; Bergman, Bergman, & Gravett 2011). CCA is a qualitative method used for the systematic analysis of non-numeric data, closely

related to qualitative content and thematic analysis (Bergman & Bergman 2011). In this step, we coded the data deductively based on the dimensions of personal agency as proposed by Bandura. The purpose of this step was to trace agency and its dimensions in the narratives of our interviewees. In the second step, we submitted the dimensions from the first step to a multidimensional scaling (MDS) analysis to reveal underlying structures of agency. The coding of the interviews yielded 964 vignettes for the MDS. The similarity matrix was calculated using the Association Strength Index and the analysis was based on the *hctar* (Berger *forthcoming*) and *smacof* (Mair et al. 2015) in R. The model parameters included a non-metric procedure with a primary approach to ties. Stress was 0.144, which is significantly lower than the stress level for a random sample, estimated at 0.24 (Spence 1979). To facilitate the interpretation of the MDS structures, we used the same similarity matrix to conduct a hierarchical cluster analysis using the Complete Linkage Method in R. The most parsimonious solution was found to be between the second and third levels of the dendrogram, which contained the largest gap between levels while avoiding parsing dimensions into too many branches. This solution was also the most interpretable. We graphed the first two levels onto the MDS map. To further assist in the interpretation of the MDS map, we conducted a third analysis, known in HCA as a re-contextualising qualitative analysis. In this step, the MDS structures are interpreted with the aid of the interview data, using CCA once again.

Results

Results 1: Connecting Bandura to the experiences of train users from Beijing

To connect Bandura's tripartite concept to the experiences of our interviewees, we coded for *intentions*, types of *agency*, *environmental facilitators* and *constraints*, *action potentials*, and *desired mobility outcomes*. The following two examples illustrate contrasting positions:

I think they [the government] are doing well. I don't think they should do anything else. In fact, it's my own problem. If I was literate, I would be capable of buying tickets with my phone by using e-banking. I can't read so I am unable to buy it. (CL, 5) (Each interview was assigned a unique identifier, denoted by the letter, followed by the page number of the transcript from which the quote was taken.)

As a Chinese person, even if they only have a standing ticket, they will endure it. Even if it's a long trip, it won't stop people from returning home. Like myself, I once took a train from Beijing to my hometown with a standing ticket. It was an 11-hour trip. Although it was really painful, when you saw that the people around you were all standing just to return home, it brought you comfort. Perhaps you complained just a little in your mind. But compared to the mood of returning home, this little complaint was only temporary. (ITm, 5-6)

The first excerpt illustrates how mobility as agency was impeded. The mobility *intention* – to purchase train tickets – was associated with two modes of agency, *proxy* and *individual agency*. According to Bandura, a *proxy* agent is someone who acts on behalf of an agent to help achieve a goal. In the first excerpt, the *proxy* was the government, which the train user viewed positively for having constructed a *facilitating* mobility *environment* through the introduction of an online ticketing platform and a digital payment system. According to this interviewee, the government fulfilled its responsibility as a *proxy* by providing the necessary infrastructure to *facilitate* the *action potential* of train users. Despite access to infrastructure, his agentic practice remained restricted due to his inability to use the infrastructure. His illiteracy prevented him from *selecting* mobility options that his *environment* provided.

The second excerpt also contrasted two modes – *individual* and *collective agency*. The mobility *intention* of this train user was to return home for the holidays. The unavailability of some tickets, however, *imposed* a restricted mobility *environment* and *constrained* his individual agency: He was still able to travel home but was forced into a travel mode that did not conform to his wishes. He nevertheless connected two modes of agency to this *constrained environment*. *Collective agency*, which Bandura considers an interdependent effort to achieve a goal, was activated in order to endure the long and uncomfortable journey. By drawing on the *collective* experience, he was able to overcome *environmental constraints* and achieved his *goal* of returning home. Table 1 summarises how Bandura's dimensions fit both excerpts:

Table 1. Summary of Bandura's dimensions connection to the data.

Bandura's concept	Examples from the data
Intentions to be mobile/ Mobility goals	Buying train tickets, returning home
Modes of agency:	
Individual	I cannot buy tickets, I stand all the way, I complain silently
Proxy	
Collective	The government is doing a good job People endure together
Environment:	
Selected	Able or unable to use new ticketing platform
Constructed	Implementations of new online ticketing platform
Imposed	Limited seating capacity/standing-only tickets
Action potential:	
Positive	We overcome constraints to return home
Negative	Inability to purchase tickets due to illiteracy

The two extracts also exemplify the suitability of our theoretical framework. Overall, we found that the mobility experiences of our interviewees connected well to the dimensions of agency proposed by Bandura and that these dimensions accounted for the mobility experiences mentioned by train users. Furthermore, systematising their mobility experiences in this way assisted in outlining how individual mobility practices connected to a Chinese sociocultural model. Specifically, the narratives on mobility experiences differentiated *individual*, *proxy*, and *collective* modes of agency. This initial analysis also illustrated interdependences between modes of agency, whereby interviewees tended to assign positive elements, such as tenacity and selflessness to a *proxy* or *collective*. Conversely, difficulties and shortcomings were attributed to the self. The tendency to assign strengths, successes, and accomplishments to proxies is a first indicator of how sociocultural agency is moulded around the technology-driven mobility turn in China.

Results 2: A sociocultural model of mobility as agency from the perspectives of train users living in Beijing

MDS was used to map the relations between agency and environment dimensions as proposed by Bandura. MDS graphs the geometric relationships between dimensions based on how frequently they co-occur in the interviews. The MDS map visualises relationships between dimensions in an n -dimensional space. To facilitate this representation, we divided the dimensions *action potential* and *desired outcomes* in accordance with Bandura's theory into positive and negative constituents (*action potential positive* and *action potential negative*, and *desired outcome achieved* and *desired outcome impeded*). To study the clustering of dimensions in detail, we also conducted a hierarchical cluster analysis and super-imposed the results onto the MDS map, using curved lines. Our interpretation was assisted further by consulting the interview transcripts.

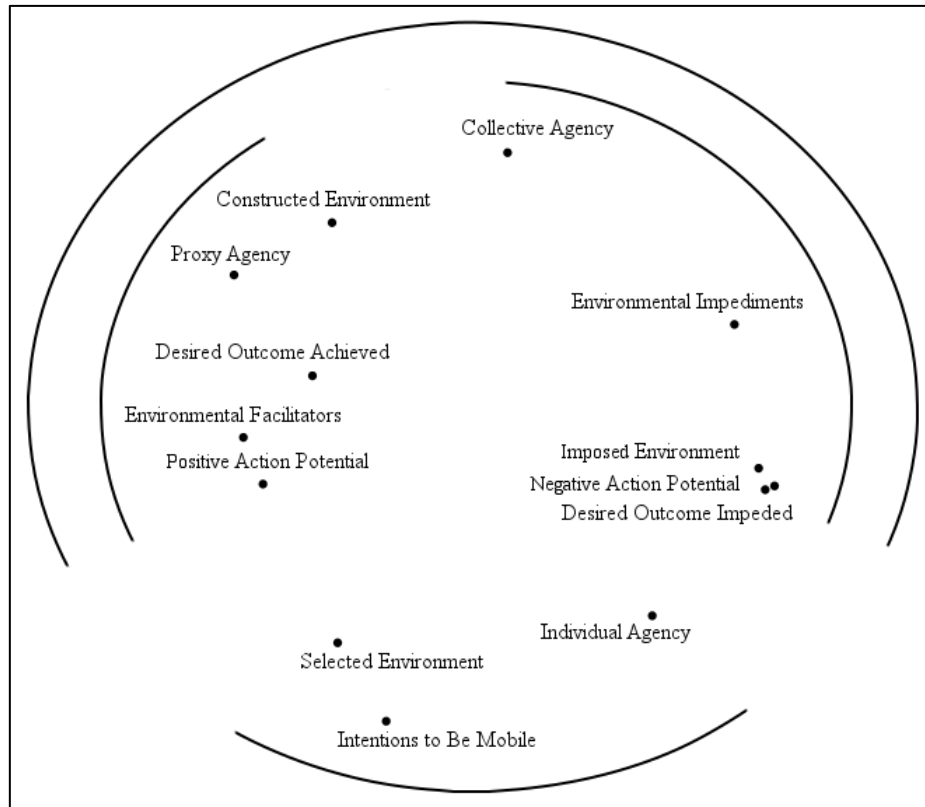


Figure 15. MDS map of mobility as agency from the perspectives of our train users living in Beijing.

Figure 15 represents mobility as agency from the perspectives of our interviewees. Each point in the map denotes a dimension as identified by our analysis in step 1, and the distance between points represents the frequency or co-occurrence of dimensions in the interview data. The shorter the distance, the more frequent dimensions co-occur. For example, the three-point cluster on the right refers to the dimensions *action potential negative*, *environment imposed*, and *desired outcome impeded*. The proximity of the points indicates that interviewees frequently connected these dimensions in their narratives. In contrast, *collective agency*, situated at the top of the figure, and *intentions to be mobile*, positioned at the bottom, are maximally distant, thus indicating that they are rarely connected in the narratives. Hierarchical cluster analysis is complementary to

MDS, and it assists in interpreting the clustering of dimensions in the MDS map. The curved lines represent the results of the two-levels from the hierarchical cluster analysis. The results of our hierarchical cluster analysis suggest that the dimensions separate into two clusters: a small cluster at the bottom of the map and a larger cluster at the top. The latter is sub-divided into two smaller clusters. The clustering of dimensions in MDS and hierarchical cluster analysis are interpretable and provide insight into the conceptual space of our interviewees in ways that would not be possible by merely analysing the interviews qualitatively.

The role of the individual: The small cluster located at the bottom of the map consists of three dimensions: *individual agency, intentions to be mobile, and the selected environment*. A re-contextualisation analysis of the narratives revealed a nexus of mobility intentions and mobility options – why people travel, how they want to travel, or why people cannot travel the way they want. This cluster refers to how train users described the range of mobility options, positively or negatively, and the selection criteria they used for these mobility options. Positive narratives in this cluster concerned the criteria interviewees used to select between different types of trains (green trains, high-speed trains), buses, cars, or airplanes. Examples included access to different mobility types, as well as comfort, convenience, reliability, punctuality, travel time, and cost. The most salient were references to travel time. Interviewees had a strong preference for the fastest option or for traveling by train because it facilitated working, relaxing, sleeping, or spending time with friends and family. Here are three illustrative examples:

When I take a train I like to take a sleeping berth because I can enjoy the scenery. I don't mind that it takes a long time. There aren't too many people,

and I can lie down if I feel tired. I can also rest on the chair, enjoy the scenery, and chat with others. It feels good. (MA, 2)

The train is always on time and much better than the plane. Punctuality is always one of my concerns. (QiH, 4)

The price of a train ticket was cheap. You see, it was just over 300 Yuan, and you just slept for one night and then you arrived. It was cheap and fast. (FG, 7)

Negative vignettes included how mobility intentions were hampered by a lack of resources or skills, as the following two excerpts illustrate:

And I also want to try high-speed rail, but it's [too] expensive. (CGu, 3)

In fact, it's my own problem. If I could read, I would be able to buy tickets through my phone by using E-banking. I can't read so I am unable to buy it. (CL, 5)

At first glance, the examples associated with this cluster seemed to epitomise individuality – personal needs, preference, and abilities. However, when examining the context of these statements, we found that they were limited to surveying or accounting for mobility options and *intentions to be mobile*. They did not refer to actual practices but merely represented a positioning of the self in relation to mobility options. What

individuals wanted, wished they had or did not have, were not explicitly transformed into mobility practices. Rather, based on our map, agentic *practices* were located elsewhere.

Collective mobility encounters: *Collective agency* is part of the right sub-cluster on top, as is *environmental impediments*, and the triad of dimensions *imposed environment*, *negative action potential*, and *desired outcomes impeded*. With the exception of *collective agency*, this sub-cluster contains negative dimensions of agency. Referring back to the interview data using a re-contextualisation analysis, narratives associated with this cluster referenced either past experiences (e.g. ‘when I was a child’, ‘when I was a student’, ‘many years ago’) or specific mobility peak times, such as the Spring Festival or other national holidays. These experiences were associated with various mobility challenges, including ticket scarcity or overcrowding, hence the connection to *environmental impediments*, *imposed environments*, *negative action potentials*, and *desired outcomes impeded*. Here are some examples:

I think the worst memory is the one when I was in primary school. I, my father, my mother, and my younger brother went to Guangdong [in the south of China]. Because we bought tickets very late, we had to take the slow train during Spring Festival. As you know, during Spring Festival, it’s a disaster because China has such a large population and it is a conditional habit, no matter where you are, you must go home for the Spring Festival. So, we took the slow, long journey, about 40 hours.... There were people everywhere, the floor, the baggage holder above the seats, people everywhere. People sitting and sleeping, someone standing and sleeping. In our carriage there was maybe more than one hundred people, just people everywhere. You couldn’t move.

Every time you want to go to the toilet, you must wake up people sleeping.
It's a disaster. (XY, 7)

We always tried to buy student tickets during the winter or summer holiday rush when most students were going back home. This meant that many students couldn't get tickets because they sold out quickly. Once I came back from Wuhan by taking a passing train, which was going from Guiyang to Beijing. When we got on the train, people on the train had already suffered a lot. Even though we only got on half way, we still couldn't stand it! When we got on the train, there weren't any seats. One carriage should carry 110 people, but actually it carried three to four hundred people. Every carriage was like that. It was not possible for you to put your feet on the ground when you were standing, and you wouldn't fall down when you slept while standing. [He laughs] It was so crowded that you felt you were going to vomit. And it was not possible for you to go to the toilet. First, it was too crowded to get there. Second, even if you got there, the toilet was full of people. (LH, 9)

Interesting in this cluster also was that most instances referred to collective *experiences*, rather than collective *practices*. In contrast to Bandura's (2006, 2001) definition of collective agency – acting together through interdependent effort, the collective in the Chinese narratives were not agents who created mobility environments. Rather, they were passively and collectively enduring challenging mobility environments together as a community of train users. The bond during these encounters was a singular, shared goal – to reach a destination by overcoming collectively shared hardships. Here are two more examples to illustrate this point:

And you can imagine, there are people everywhere, so they can't do anything. Even if you want to pass down the corridor, they can't move. People can't move because there are so many people. And I can understand why there are so many people on the train – because people want to go home. So just let them in and then they can go home.... And people are willing to stand the crowd, the noise. Because they just want to go home. (Zl, 11)

Our requirements were very little when the conditions were not good. (LH, 4)

In sum, mobility as agency in this sphere concerned the collective experience of enduring mobility difficulties. Determination and perseverance to overcome hardship were either tied to a past that was presented in terms of lack of development or travel options, or presented in terms of a present that imposed temporary and exceptional hardship while traveling during rush hour or journeys home during public holidays and festivals.

The role of the proxy: The sub-cluster on the left of figure 15 contains the *constructed environment, proxy agency, environmental facilitators, outcomes achieved*, and a *positive action potential*. Re-contextualisation analysis of this sphere revealed the Chinese government as the most frequently mentioned proxy. Most narratives in this cluster concerned the government's role in the development of mobility infrastructure. Temporality plays an important role here as well. In this cluster, however, it was connected to the present and the future: Present-oriented narratives dealt with newly developed train infrastructure and the positive impact new technology had on the lives of

interviewees. Examples include government initiatives for new or expanded high-speed rail, bullet trains, intercity connectivity, and enhanced customer services and passenger amenities. According to our interviewees, these technological innovations have increased the capacity and reliability of trains, and they have vastly improved access, comfort, and convenience. Embedded in the narratives was a belief that this developmental trend from a less developed past to a highly developed present would continue into the future as the government promotes large-scale technology and infrastructure projects, such as ‘Made in China 2025’ and the ‘Belt and Road’ initiative. The following examples illustrate the continuation of China’s mobility turn:

As for the decision-makers of trains, I think they have done well in terms of intercity high-speed rail, especially after the “Fuxing” [复兴号; name of the high-speed rail in China] train was put into use. It’s become much more comfortable. (CGi, 12)

The decision-makers of trains? I think they have done well. (CGu, 4)

In the past, it was not convenient for people to go out. We didn’t have high-speed rail and the trains were not as many as nowadays. Each day there was only one train from Beijing to Nanning and only two trains to Guilin. So the tickets at that time were really scarce. But it has become much better now. There are two normal trains and one high speed rail every day, and all kinds of transportation tools. Also, there are more trains to Guilin now. It’s been much easier to buy a ticket now. It’s been developed. Sometimes we think of

corruption problems in China but, if we think twice, we would find that things are becoming better gradually. (DE, 2)

This mobility sphere was marked by a present- and future-oriented optimism that was mainly tied to how the government as the proxy agent develops and administers China's mobility landscape. Presently, the government has greatly improved day-to-day mobility experiences by improving comfort, convenience, accessibility, affordability, speed, safety, and efficiency. According to our interviewees, this developmental trajectory would not merely persist within China but expand to establish global dominance through coordinated and continued technological innovation by a central government. Reports on such national successes and global ambitions were also underpinned by a display of national pride.

Connecting the past, present, and future: The two sub-clusters situated at the top of figure 15 form a large agentive cluster. Despite their differences, they are components of a large cluster that dominates the figure. The first commonality relates to a time dimension. From right to left, the temporal dimension originates in a technologically limited and underdeveloped past, merges into a vastly improved present that nevertheless contains occasional shortcomings, and morphs into an anticipation of a rapidly evolving, technologically sophisticated, publicly accessible, and nationally (and even internationally) dominant future. Here are examples of this temporal trajectory:

And I feel that trains have been changing really fast, especially nowadays, from the old slow train to the recent one. (LH, 1-2)

In my mind, traditional trains are the ones with old equipment, even without air conditioning. And they travel slowly. Maybe some traditional trains with beds are slightly better. I think these are the traditional trains. Long-distance travel by traditional train, you might have to spend the night in the train. But if you take the high-speed train, also called the modern train, you can reach your destination within twelve hours in most cases. The high-speed train is the new definition of a modern train. (ZG, 1)

So I think the current train is good enough. We have enough options, the quicker one, the slower one, and the best one. (CGu, 4)

The first stage [of the future] is the flying train. Its concept has been put forward. If you have the interest, you can search it. It is 4000 km per hour and it will just take 3 minutes from Beijing to Tianjin and just more than ten minutes from Beijing to Shanghai. It will be really convenient. (PD, 6)

The second unifying element in this dominant cluster is the centrality of *collective agency* at the top of figure 15. Situated midway, it is the core dimension that transcends mobility narratives across time. The narratives revealed that the collective share a technologically underdeveloped past, collectively enjoy advantages and suffer disadvantages, and are expected to transition into a greatly improved, technologically advanced future. There were two crucial features to this collective transition: Interviewees were aware that not everyone enjoyed the same level of access and privilege, something considered to be a temporary flaw in a rapidly developing, collectivistic nation. According to the narratives, the collective will enjoy the benefits of the future through technology that is accessible to

all members of society. As the *proxy* agent, the government, is charged with, and expected to fulfil, the responsibility for creating a mobility environment that will extend the socioeconomic trajectory of recent decades through centralised, coordinated, long-term efforts and through technology to all members of society including vulnerable social groups, such as the elderly, the poor, the uneducated, and migrants to the city. Here are some final examples:

I think in the future the development will focus on making people's lives more convenient. The most important thing for development shall be the so-called “以人为本” (“people-focused”) principle. How to make people's lives more convenient when out and about, how to simplify the processes. This is most important. (CGi, 17-18)

Why are the prices of seat-tickets and standing tickets the same? They belong to different classes. As far as I am concerned, the reason why many migrant workers and other people bought standing tickets is that they could only get that kind of ticket because of their own personal situation, such as their lack of resources or poor education. Actually these people should be cared for more by the government. (ITm, 12-13)

As the speed of the trains continue to increase in the future, it would mean that the prices will become much higher, and I worry about this group of people I mentioned just now, those who are low-income, because they will have fewer options. And I would expect more discounted ticket prices.

Discounts for ordinary days and increases for holidays and busy days. This could be one way to balance it. (YuH, 7-8)

Three sociocultural components can be extracted from these findings. First, a profound collectivism underpins most of the narratives, ranging from challenges associated with a collectively shared past or peak mobility experiences, collectively shared mobility desires associated with comfort, affordability, and going home to be with family, as well as collectively shared aspirations to participate equally in the envisioned high-tech future. The latter was associated with a concern for collective well-being, in part hedonistic and in part socioeconomic, entirely founded on expectations of a bright future based on technological advancement. Interestingly, collectivism portrayed in this way was not agentive in the classic sense since the collective was not expected to ‘act’ beyond moral obligations and hard work. Instead, the collective was tied to collectively shared experiences and collective expectations toward the proxy agent – the government – to act as a caretaker and on behalf of the collective.

The second component refers to the fundamental role of government as the fulcrum for technological transformations in China. It is charged with a multidimensional and far-reaching project: to create public goods and services that benefit the lives of the entire collective well beyond mobility. In this sense, the government is held accountable for the well-being of the collective, and its success is judged by the speed, kind, and degree of improvements. Strikingly, most narratives implicitly assumed that the government will definitively fulfil these responsibilities and that all members of society will eventually benefit.

The final component relates to the central role of technological development as a tool for government to continuously improve the well-being of the collective. Instead of its disruptive potential, technological advances were expected to contribute to a societal transformation that is fully integrated into the sociocultural model in China: hard work and morality of the individual, collective experience of the citizenry that is tied to a shared history and destiny, and government as the accountable proxy agent and vehicle to move the collective and its individuals through time toward ever-increasing improvements of well-being.

Discussion and conclusions

While our data is not representative or generalisable to Chinese society as a whole, the goal of this study was to explore the complex interactions between agency and environment dimensions according to Bandura's model of Triadic Reciprocal Causation in the context of train users living in Beijing. We empirically examined (1) if these dimensions were present in the narratives of our sample, (2) how the dimensions interrelated with their mobility practices, and (3) how to understand the disruptive potential of sociotechnical transformation in the form of large-scale, affordable mobility on Chinese cultural models and practices. Our analysis revealed that the theoretical framework is suitable for our data, and that it adequately captures mobility practices of our interviewees. The presentation of mobility practices are deeply rooted in the collectivistic mindset of our interviewees. Mobility as agency was framed as shared and collective mobility desires, aspirations, experiences, and destinies, including vulnerable

social groups, such as the elderly, the poor, the uneducated, and migrants from remote, rural areas. Successes tended to be attributed to collective and proxy agents, and failures to the self or to a temporary system glitch. Collectivistic and Confucian values are most salient during difficult, overcrowded journeys, which are framed by notions associated with solidarity, tolerance, harmony, or stoicism as personal preferences are either put on hold or subordinated to the perceived needs of the collective.

While we also expected to find a strong sense of national pride and patriotism – cultural hallmarks of modern Chinese society, we were surprised by the extent to which national pride and, by extension, the collective is framed so clearly within the remit of a proxy. One of our most striking findings relates to the role of government as an accountable administrator, tasked with staging a positive developmental trajectory. The potential of large-scale sociotechnical transformations to disrupt existing sociocultural models in China is embedded in the entrenched expectations of rapid and successful socioeconomic development that our interviewees place on the CCP. While technology may indeed have considerable potential in domains relating to media access and information technology, its disruptive potential relating to mobility systems is absent in our data. Instead, China's mobility turn and the advances in mobility technology associated with it are presented as significant components for achieving collective socioeconomic aspirations. Instead of disrupting established sociocultural practices, the government is expected to utilise mobility technology to advance the dream of Chinese socialism (“中国特色社会主义”). Accordingly, our interviewees are less likely to associate themselves with the CCP but more with the Chinese collective that is benefitting from socioeconomic development as designed and managed by the policies of the CCP.

Much has been written on the CCP's 'performance legitimacy', the way the central leadership maintains support beyond its ideological platform, primarily through the country's continued developmental success (e.g. Bergman et al. 2015; Fewsmith 2012). Our study provides further empirical evidence in this regard. From the three modes of agency (individual, proxy, and collective), only the proxy was assigned explicit agentive practice. Not only is it assumed that the government has taken charge of development and, thus, the future and destiny of the nation, but it is expected that the government takes charge of the future. Considering the tremendous success our interviewees attribute to the government's performance in relation to the development of national train mobility systems, the latter is a great source of pride and the performance of the former is assessed positively. The intimate relationship between pride and performance provides the foundation for a positive feedback loop, which maintains and fosters the existing sociocultural model in China. By administering mobility potential (Bærenholdt 2013; Doughty & Murray 2016) to actively create and maintain a local and global networked society (Urry 2000, 2002), the government uses it not merely as a vehicle to corporeal travel but as tool to actively construct national identity and culture (Jensen 2009). Interestingly, this argument can be extended further: The proxy can count on the support of the individual and the collective as long as it advances sociotechnical mobility in the service of further socioeconomic development for the perceived benefit of the collective.

This has important policy implications for contexts beyond China's collectivistic culture as our study points to the potential of understanding the mobility turn as an integrative component of, even a catalyst for, existing sociocultural models – the conditionality of support of a government by individuals and a collective. As researchers, we often mistakenly situate mobility turns and technological transformations associated with them

outside of cultural practices. We assume that the former impacts on, disrupts, or changes the latter. We conceptualise inequality, marginalisation, and exclusion as typical outcomes of sociotechnical transformations. The mobility revolution in China reminds us that a mobility turn is as much a cultural artefact as it is a transformation. Mobility research and policies that use this as a point of departure would be better positioned to capture the relationality and conditionality between a mobility turn, culture, and (subjectively perceived) development. The question then would not be how a mobility turn impacts on members of a group or society, but rather how the mobility turn will be utilised to foster society and its sustainable development. Within such a framework, sustainable mobility is not a utopian ideal but a tangible, negotiated goal for which the spatial displacement of people, goods, technologies, information, or data is in congruence with economic, social, and environmental concerns, in line with prevailing or anticipated contexts, cultural developments, and systemic capabilities of a society.

“If you want to go fast, go alone. If you want to go far, takes others with you.”

(African proverb n.d.)

CHAPTER FIVE

Mobility as agency from the perspectives of Metrorail commuters in the Western Cape, South Africa

Introduction

Sustainable mobility policies tend to employ either technical, socio-structural, or psychosocial interventions, all of which face considerable challenges. Technical and socio-structural interventions attempt to implement technological and infrastructural changes that require access to affordable raw materials, industrial capacity, technological advances, and significant financial investments to be developed and maintained. Furthermore, the implicit assumption of this approach is that the public could be enticed to adopt these new and potentially disruptive technologies. In contrast, psychosocial interventions, also referred to as soft policy approaches, use individual or group interventions to promote more sustainable attitudes, values, norms, behaviours, and practices. While less disruptive and more cost effective than hard policy approaches, these interventions have limited success since they tend to focus predominantly on how people travel and not why they travel (Cass & Faulconbridge 2016) and because they often neglect environmental constraints, such as shortcomings in mobility infrastructure or other structural barriers (Bergman et al. 2014; Bergman & Bergman 2015; Bergman & Bergman 2019). They also implicitly assume that alternative sustainable mobility options exist, and that people have access to them. Few studies have transcended the socio-structural and psychosocial silos of hard and soft policy approaches to examine mobility practices as complex and multidimensional interactions between individual, social, and

environmental factors (Shepherd & Marshall 2005) even though the consensus is that this is where sustainable mobility research will have the most impact (Bergman 2015; Bergman & Bergman 2019; Bergman 2019; Bergman, Bergman, & Thatcher 2019; see also Charlton 2004; Steg & Gifford 2005). Even less studied are contexts where the challenges preventing the successful implementation of sustainable mobility are the defining characteristics of the mobility ecosystem. While the inadequate and decaying state of Metrorail and the consequences for sustainable mobility was the focus of Chapter Two, the purpose here is to examine in more detail what happens to mobility as agency in this context by analysing the mobility practices of 38 train commuters in the Western Cape, South Africa, using Hermeneutic Content Analysis (Bergman 2010). Given the variability of this research site, no a priori assumptions about agentic pathways frame this particular study, instead the core properties of mobility as agency as illustrated in Figure 16, provide a general framework for the empirical inquiry.

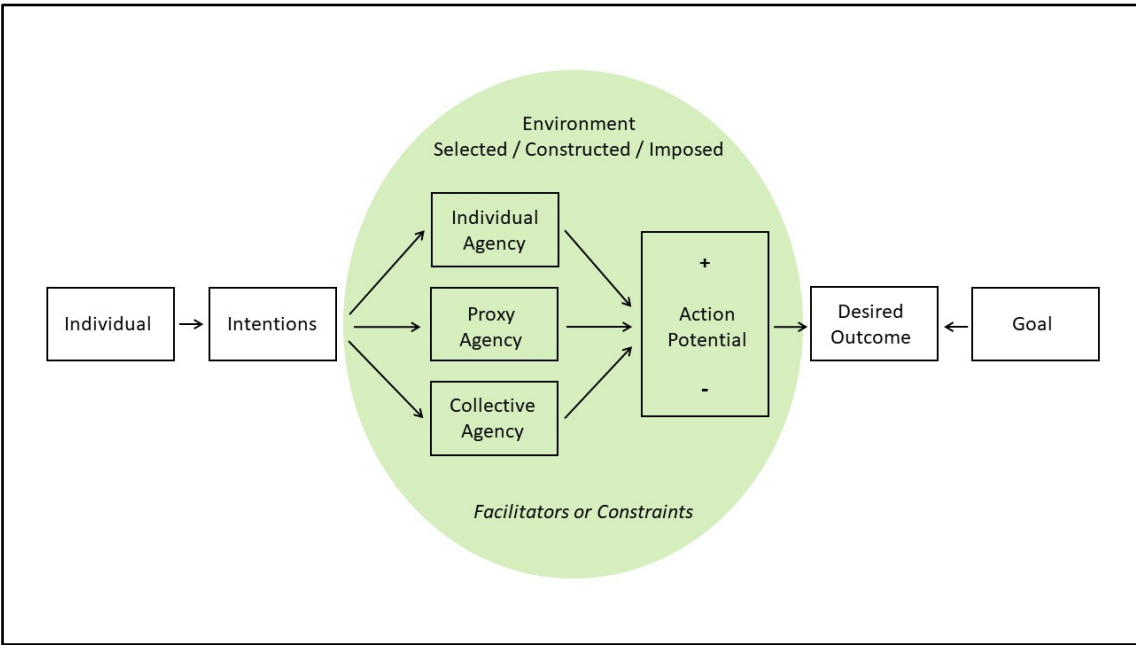


Figure 16. Potential of mobility as agency of Metrorail users in the Western Cape, South Africa.

As with the previous studies, one of the rationales for using mobility as agency as an analytic framework is to expand empirically the applicability of Bandura's work, which, to date, has remained too often limited to conventional, unidirectional applications of SCT. Using Bandura's concept of personal agency and his Model of Triadic Reciprocal Causation to study the multidimensional nature of mobility practices of Metrorail commuters in the Western Cape enables the individual, proxy, and collective components of agentic practice to be situated within the psychosocial and socio-structural environments of daily mobility experiences. Beyond extending the applicability of Bandura's work in the field of psychology, the empirical application of the conceptual framework of mobility as agency helps to illustrate the reciprocal relationship between technical, socio-structural, and psychosocial effects on mobility behaviour. This in turn contributes to the field of sustainable mobility an approach that goes beyond current limitations of technical and socio-structural or psychosocial interventions.

The analysis of the perspectives of 38 train commuters in the Western Cape, South Africa, identified all three modes of agency present in mobility narratives. Each is associated with a distinct agentic pathway, which serves a specific function in relation to different environments. The individual agentic pathway aligns most with self-efficacy and the classical understanding of achieving one's goals. While this seems to indicate that mobility goals are achieved using this pathway, in the case of Metrorail commuters, references to this individual agentic pathway remains largely aspirational – pertaining to hypothetical or desired mobility options. Most commuters do not have access to alternative mobility systems and thus depend on the ailing and unreliable Metrorail system as their primary mobility mode. The individual agentic pathway, therefore, represents the mobility wishes and desires commuters' voice in the absence of meaningful

alternatives. The proxy agentive pathway, represented here by the government and Metrorail, should be actively creating and maintaining the public mobility environment upon which these commuters depend. While promises to make investments to address the failing system are often communicated to commuters and the public at large, these rarely materialise. The failure to do so creates the conditions which maintain the inadequate system within which commuters are trapped. Consequently, while the potential and purpose of this agentive pathway is clearly delineated, it remains unconnected to the practice of mobility as agency. Frustrated commuters who describe themselves as abandoned turn to the only agentive pathway still available to them – the collective agentive pathway. Here, the social ties among family members, friends, colleagues, and religious networks become the protective buffer that helps commuters survive the inadequate system imposed on them. We therefore find that mobility as agency from the perspectives of Metrorail commuters in the Western Cape, as illustrated in Figure 17, is divided into distinct pathways that frame mobility aspirations of the individual, mobility expectations of the role the proxy ought to play, and mobility realities made possible by the support and protection of collective ties.

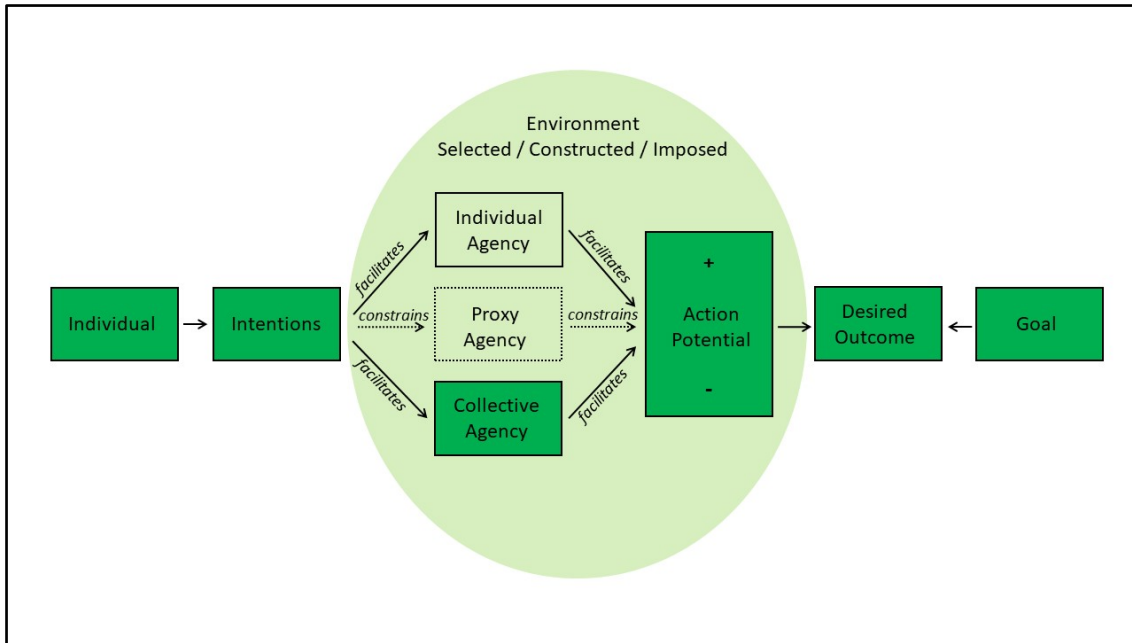


Figure 17. Mobility as agency from the perspectives of Metrorail users in the Western Cape, South Africa.

Mobility as agency from this perspective illustrates the limitations of conventional hard and soft mobility approaches since the identified agentic pathways are not unidirectional or mono-focal but rather reciprocal interactions between personal agency and environments. In addition to this, the considerable obstacles that prevent the agentic practice of Metrorail commuters have profound consequences on the nature and degree of these interactions. A conclusion drawn based on this emphasises that sustainable mobility policies aimed solely at individual behaviour change or environmental and structural barriers are likely to have only limited success because the Metrorail environment is insufficiently aligned with different types of agency. For sustainable mobility interventions to be successful, the mobility preferences and behaviours of individuals should be conceptualised in relation to the specific context and culture within which they unfold. Responding to the unique constellation of psychosocial and socio-

structural dynamics that define mobility practices will require a careful blending of hard and soft approaches, and mobility systems that can successfully integrate contextual and cultural sensitivities will represent a formidable baseline for agency well beyond the mobility domain. In the case of Metrorail, the prerequisite of sustainable mobility, however, will depend on removing the considerable obstacles that prevent the agentive practices of these commuters.

Agency and Bandura's Model of Triadic Reciprocal Causation: An Exploratory Mobility Study among Metrorail Commuters in the Western Cape, South Africa

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Abstract

Most studies on sustainable mobility focus on technological, socio-structural, or psychosocial influences while neglecting individual motivations and practices. In this study, we examine mobility motivations and practices as part of a complex interplay between psychosocial and socio-structural dimensions within the mobility infrastructure of Metrorail in the Western Cape. Drawing on Albert Bandura's theory of personal agency and the model of triadic reciprocal causation, we interviewed 38 commuters (mean age 33 years, SD 11, 50% women/men) and analysed the data using hermeneutic content analysis and multidimensional scaling. Based on our analyses, we identified three pathways that describe the mobility practices of Metrorail users, each with its own purpose and function. We explore these pathways and their consequences for sustainable mobility in relation to daily commuter agency, motivations, and past experiences.

Keywords: Sustainable mobility, Albert Bandura, agency, triadic reciprocal causation, mixed methods, hermeneutic content analysis, content configuration analysis, Metrorail.

Introduction

Despite decades of innovations and interventions, the transport sector still accounts for approximately one-sixth of greenhouse gas (GHG) and CO₂ emissions (IPCC 2007, 2014). Consequently, mitigating environmental, health, and social risks caused by mobility practices remain a crucial challenge (Bandura 2008; Geerken et al. 2009; Guadagno 2016; Boas 2017; Yamamoto, Serraglio, & de Cavedon-Capdeville 2018). More sustainable mobility practices would mean “to reduce the need to travel (less trips), to encourage modal shift, to reduce trip lengths and to encourage greater efficiency in the transport system” (Banister 2008, p. 75). Such solutions tend to focus on either technical and socio-structural changes or psychosocial interventions.

Technical and socio-structural approaches aim to mitigate GHGs by increasing the efficiency of transport systems. Known as hard policy approaches, they seek to remodel transportation systems through technological and infrastructure development (Novaco 2001; Brög, Erl, & Mense 2004; Hunecke et al. 2007; Gehlert et al. 2013). Current green technology solutions include mass public transit, high-speed rail, shared and autonomous mobility systems, and electric vehicles.

Hard sustainable mobility policies tend to assume availability and affordability of raw materials, industrial capacity, and extensive investment for the development, implementation, and maintenance of disruptive technologies. Also assumed is that, for example through incentives or taxes, the public could be enticed to support the necessary economic, political, and cultural changes that are part of the disruptive technology.

Psychosocial approaches focus on individuals or groups to improve the sustainability of mobility (Brög et al. 2004; Stanton et al. 2013). At the centre of the so-called soft approach are individual or collective attitudes, values, norms, motivations, preferences, habits, and behaviours with the goal of creating modal shifts in why and how individuals or groups travel (Novaco 2001; Steg & Vlek, 2009; Gehlert et al. 2013). Public appeals and awareness campaigns are currently the main tool to increase knowledge and acceptance of sustainable mobility (Brög et al. 2004; Hunecke et al. 2007). Included under this rubric are approaches that focus on inequality (Titheridge, Mackett, Christie, Oviedo Hernández, & Ye 2014; Zhao & Li 2016), inclusiveness (Bergman et al. 2014; OECD 2016), access (Starkey & Hine 2014; Bergman & Bergman 2015; World Bank 2016), and ecological behaviour (Collado, Staats, & Corraliza 2013; Lokhorst, Werner, Staats, van Dijk, & Gale 2013; Pillemer et al. 2017; Landry, Gifford, Milfont, Weeks, & Arnocky 2018). Compared to hard policy measures, psychosocial interventions tend to enjoy a greater degree of political support because they can be implemented at significantly lower cost and with fewer systemic disruptions (Stanton et al. 2013). However, psychosocial interventions encouraging modal shifts have had limited success partly because initiatives and policies tend to emphasise how people travel, not why they travel (Cass & Faulconbridge 2016), and because they often neglect environmental constraints, such as shortcomings in mobility infrastructure or other structural barriers (Bergman et al. 2014; Bergman & Bergman 2015).

With few exceptions (e.g., van Wee et al. 2002; Poortinga et al. 2004; Collins & Chambers 2005; Hunecke et al. 2007; Steg et al. 2014), most mobility studies focus on either technical and socio-structural or psychosocial dimensions of mobility. Hunecke et al. (2007), for example, examined the effect of psychological, socio-demographic, and

infrastructure influences on the ecological impact of mobility behaviour. Other notable studies include Poortinga et al. (2004), who analysed the impact of value dimensions concerning different psychological and environmental aspects on home and transport energy usage, and Steg et al. (2014), who studied the impact of values, situational cues, and goals to encourage pro-environmental behaviour. Finally, van Wee et al. (2002), Collins and Chambers (2005) and Hunecke et al. (2007), explored psychological, sociodemographic, infrastructural, or situational effects on mobility behaviour. Despite diverse foci, these studies arrived at similar conclusions: mobility practices are nested within a complex network of individual, social, and environmental factors, and the consensus seems to be that we need to better understand the synergy between individuals and their mobility environment in order to exploit the potential of behaviour change toward more sustainable mobility (Shepherd & Marshall 2005). Given the relative neglect of the interdependence between commuter motivations and practices in specific mobility environments, little is known about what a sustainable transportation system would look like, what criteria should be used to assess it, or what would make it socially and culturally acceptable (Steg & Gifford 2005). Charlton (2004, p. 165) argues that “[u]nless these complex, interrelated socio-economic and behavioral influences can be properly interpreted and, crucially, incorporated into policy and practice, genuine advances to greater sustainability will be elusive.”

In this article, we first present Albert Bandura’s triadic reciprocal causation as a suitable theoretical framework that can account for the complex interdependence among mobility intentions, practices, and the environment in which they are embedded. We then present an empirical application of this framework to analyse mobility practices of train commuters in the Western Cape, South Africa. The overall aim of this article is to

contribute to a better understanding of individual agency within specific mobility environments in order to improve conceptualisations and implementations of sustainable mobility solutions.

Theoretical Background

We encounter multiple and constantly changing environments each day, requiring a vast array of choices. Despite ever-changing dynamics, we manage to negotiate a highly complex world because our behaviours are neither hardwired nor mere products of our environment. As active agents, we influence outcomes, we act upon others' behaviour, and we coordinate behaviours with each other (Bandura 2006).

Social cognitive theory (SCT) as developed by Albert Bandura proposes that human behaviour encompasses core features that include not only internal behavioural predispositions, such as cognition, affect, or motivation, but also various environmental influences (Bandura 2001). SCT terms deliberative behaviour *personal agency*, which has been studied extensively in psychology (Bandura 2006, 2008), public health (Bandura 2004a), education (Rogers et al. 1999; Chapman-Novakofski & Karduck 2005), business and management (Schmutzler, Andonova, & Diaz-Serrano 2018; St-Jean, Radu-Lefebvre, & Mathieu 2018), and media studies (Bandura 2004b; Gibson 2004). Personal agency refers to an individual's ability to “designedly conceive unique events and different novel courses of action [while choosing] to execute one of them” (Bandura 2001, p. 5). It includes complex processes of intra-personal cognitive processing, deliberation,

and decision-making, motivated by a desire to achieve specific outcomes. According to Bandura, desires shape our *intentions* to act, thus preceding behaviour toward goals or aspirational ends. Subsequently, desires to achieve an end serve as the impetus for, and the intended outcome of, our actions. The process of turning intentions into *goals* involves a number of decision-making strategies. The first relates to three modes of agency: *individual*, *proxy*, and *collective*. According to Bandura (2001), individual agency entails the process whereby people deliberately guide their behaviour within an immediate environment. If the goal is to get to work, for example, we may elect to drive our car or ride bicycles. Individual agency has its limits because individuals may not always be able to act on their own behalf. Children, for example, are unable to drive cars, and they may not own or be allowed to ride their bicycle to school. In this case, agency without the assistance of others is impeded. Proxy agency involves enlisting others to act on our behalf to secure desired outcomes. Collective agency refers to collective efforts to achieve a desired outcome through interdependence and the activation of networks (Bandura 2008). This might entail organising a car sharing club or petitioning local politicians to fund a public transit system. Each mode offers a different way to achieve a goal, and despite cross-cultural variations, we rely on all three modes of agency to conduct our lives (Bandura 2001).

Agency is mediated by contextual and cultural influences, such as “activities, situational circumstances, and socio-structural constraints, and opportunities” (Bandura 1999, p. 6). It is preceded by an assessment of opportunities and constraints inherent in socio-structural or contextual environments (Bandura 2001). Environments are assessed and perceived to facilitate or hinder the ability to act. Car ownership and lack of access to public transport are examples of components of mobility environments that facilitate or

obstruct mobility pathways. Bandura (2001) distinguished between three environments, namely the *selected*, the *constructed*, and the *imposed* environment. The selected environment provides the largest scope of behaviour and therewith the broadest agentive space. Here, individuals are agents of their realities, they have at their disposal a range of different behavioural options, and they can choose behaviours that best suit a desired outcome in a specific situation. By choosing “associates, activities, and milieus,” environments are selectively activated as individuals formulate appropriate courses of action and decide how to behave (Bandura 1999, p. 6). In terms of mobility practices, a selected environment may include access to mobility modes, such as a car, bus, or train. The modal choice reflects whatever is perceived to best achieve a desired outcome. The constructed environment requires concerted effort to become a viable agentive option. It restricts agentive practice because it requires “people to construct social environments and institutional systems through their generative efforts” (Bandura 1999, p. 6). Examples include arranging a ride in a car sharing club to get to work, campaigning for public transport systems to be extended into a township, or relocating to reduce the distance to a train station. The imposed physical and socio-structural environment narrows the scope of agency because it dictates the boundaries within which people behave and, although “they have little control over its presence, they have leeway in how they construe it and react to it” (Bandura 1999, p. 6). For example, walking long distances to school as the only form of available mobility reflects an imposed environment. Agency still exists in which the pupil may choose whether to attend school on a given day, or which route to take to avoid anticipated hazards.

The modes of agency and their environments are interdependent. According to Bandura (2006 p. 6), “internal personal factors in the form of cognitive, affective, and biological

events, behavioural patterns, and environmental influences all operate as interacting determinants that influence one another.” Derived from SCT, Bandura’s model of triadic reciprocal causation (Bandura 1986; see also Bandura 1989, 1999, 2001, 2006) emphasises that personal agency is inherently psychosocial and functionally dependent on events. Accordingly, agency may be presented as follows:

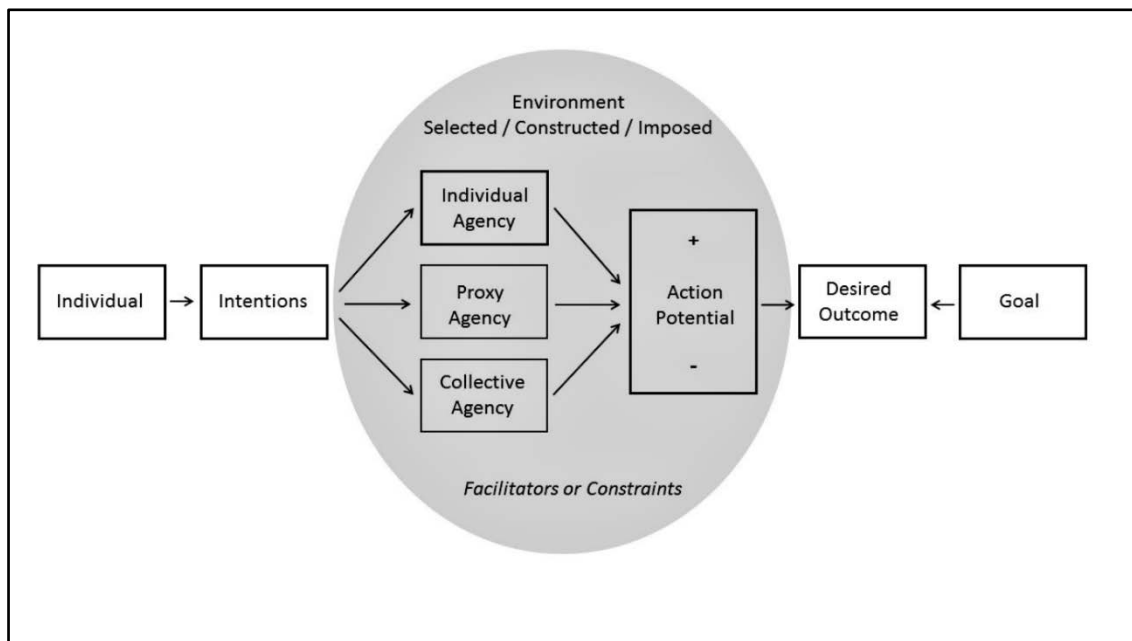


Figure 18. Model of Bandura’s personal agency and triadic reciprocal causation.

Figure 18 models individuals’ intentions to achieve desired outcomes. Through complex processes of intra-personal deliberation, individuals assess how various environments (selected, constructed, or imposed) facilitate or constrain their potential to act (action potential), as well as how different modes of agency (individual, proxy, or collective) enable them to achieve their goal. Based on deliberations within environments, individuals choose the mode of agency (individual, proxy, or collective) that will most likely secure a desired outcome in a specific context. An appropriate course of action is then selected and implemented as people adjust their behaviour accordingly.

Given the variability of options and conditions, it follows that no fixed, predictable pattern of reciprocal interaction exists (Bandura 2006). The uniqueness of the constellation of agency in a given environment makes agency inherently difficult to study. One of the main criticisms aimed at Bandura's work relates to the relative looseness of the concepts and their interdependence (Tschannen-Moran & Hoy 2001; Garvis & Pendergast 2016). Others argued that the conceptual overlap between expectations (intentions) and outcomes limits the applicability of the theory (Eastman & Marzillier 1984). Consequently, most SCT studies reduced agency to individual agency, focusing predominantly on self-efficacy to model behaviour change, such as in the field of health, especially therapeutic research (Bandura 1997; Langlois et al. 1999), preventative health (Tougas et al. 2015), public health education (Ryerson 1994; Rogers et al. 1999; Bandura 2004a; Chapman-Novakofski & Karduck 2005), education (Bores-Rangel et al. 1990; Church et al. 1992; Hackett & Byars 1996), and media studies (Gibson 2004; Hill et al. 2009). The selective focus on intra-personal, cognitive dimensions of individual agency limits accounts of human behaviour in situations that transcend the confines of unidirectional modes of causation (Bandura 1999). The fact that most studies have applied only one type of agency from SCT (Carillo 2010) and the consequences of this one-sided application represents the most compelling critique against studies on personal agency.

We seek to expand the conventional, unidirectional application of SCT by exploring the multidimensional nature of personal agency as initially formulated by Bandura and by applying triadic reciprocal causation to mobility practices of Metrorail commuters in the Western Cape. The rationale for this study are three-fold. First, we aim to study human agency using the model of triadic reciprocal causation to expand the applicability of

Bandura's theory. This means situating individual, proxy, and collective components of agentive practice within psychosocial and socio-structural environments. Second, we apply this multidimensional concept of agency to study mobility practices. Specifically, we propose to analyse agency and mobility practices in the context of Metrorail commuters in the Western Cape, South Africa. Metrorail is the largest commuter train service in South Africa, transporting approximately 2 million people every day on 2228 km of track. The local Metrorail network in the Western Cape region has been operational since 1863. It consists of four main lines – a Northern Line, Southern Line, Cape Flats Line, and Central Line with 610 km of track and 119 stations that connect informal settlements, townships, suburbs, towns, and cities in the South Western Cape. Third, by exploring mobility with Bandura's multidimensional approach to agency, we hope to contribute to a debate on sustainable mobility that goes beyond interventions, which focus on either technical and socio-structural or psychosocial manipulations. In other words, Bandura's theory of agency will be used in a case study to argue for a reciprocal relationship between technical, socio-structural, and psychosocial effects on mobility behaviour. Our rationale translate into three research questions:

1. Can we empirically identify the agency and environment dimensions outlined in Bandura's model of triadic reciprocal causation in the narratives of Metrorail commuters?
2. How do the dimensions of agency and environment interrelate in the reported mobility practices of Metrorail commuters?
3. What are the implications of conceptualising agency accordingly on the understanding of sustainable mobility systems for Metrorail commuters?

Materials and Methods

Sample

This study is based on 38 narrative interviews with Metrorail commuters in the Western Cape. Three selection criteria assisted in identifying eligible participants: mobility type (use of Metrorail), frequency (week-day commutes during that past 2 years), and geographical location (multiple commutes per week in the wider Cape Town or Stellenbosch region). The interviewed men ($n = 19$) and women (age range 18–62 years, mean 33 years, SD 11) were multi-ethnic (black, white, and colored – In South Africa, the term ‘colored’ is colloquially used to denote people from a mixed race background.), multi-lingual (speaking predominantly Afrikaans, isiXhosa, and English, as well as Tswana, Sesotho, Sotho, and isiZulu), and pursued a variety of occupations (students, teachers, security guards, shop attendants, cleaners, drivers, administrators, couriers, repair men and women, managers, occupational therapists, personal assistants, and unemployed). All recruited participants took part in the interview. The coding of the interviews yielded 784 codes for the multidimensional scaling (MDS) analysis, which is regarded as an adequate sample size for a dimensional analysis (de Winter, Dodou, & Wieringa 2009). Considering the small size of the sample, we could not control for the effect of individual differences.

Procedure

Before commencing data collection, we obtained permission to conduct the research from the University of the Witwatersrand Human Research Ethics Committee. Based on our sampling criteria, participants were recruited near train stations in Cape Town and Stellenbosch. Interviews were conducted immediately, or at an arranged time near the station (in public spaces or cafes), or at a venue negotiated between the interviewer and the participant. All requests for interviews were accepted. Interviews were conducted in English or Afrikaans (the two dominant languages in this region). The interviews averaged approximately 40 min. All interviews were recorded, transcribed, and anonymised for analysis.

Instrument

The interview schedule was developed and refined during two pilot phases with members from the research population. The interview schedule included exploratory and semi-structured questions. Initially, exploratory questions aimed to elicit extended narrative responses from interviewees regarding their mobility experiences. Question included “Tell me everything that comes to mind when you think about trains” or “What is your best memory with a train?” These were followed by semi-structured questions aimed to prompt specific mobility preferences or to examine mobility dimensions in detail, such as “When, where, and how often do you take trains?” or “What do you think will happen with trains in the future?”

Analysis

Data were analysed using hermeneutic content analysis (HCA; Bergman 2010), a three-step mixed methods approach. First, interviews were analysed using content configuration analysis (CCA; Bergman 2011; Bergman & Bergman 2011). CCA is a qualitative method used for the systematic analysis of non-numeric data, closely related to qualitative content and thematic analyses (Bergman, Bergman, & Gravett 2011). For this article, interview data were coded top-down, using the dimensions of personal agency as proposed by Bandura. Due to the mobility focus of our study, we also coded intentions and outcomes that pertained to mobility within mobility environments. The coding scheme was developed and applied in a research team. Two independent coders applied the coding scheme iteratively until the emergent coding taxonomy stabilised. The purpose of the initial CCA was to trace dimensions of agency and environment as outlined by Bandura in the context of Metrorail commuters in the Western Cape. In the second analytic step, we identified agentive pathways and mobility environments, using MDS, which enabled a geometric representation of co-occurrences between agency and environment dimensions. We calculated similarity matrices using the Jaccard Index based on the *thectar* (Berger *forthcoming*) and *smacof* (Mair et al. 2015) in R. The unit of comparison was at code-level ($n = 784$), and the parameters included a non-metric procedure with a primary approach to ties. Stress was at 0.11, which is considerably lower than the stress level for a random sample of the same number of points in MDS, estimated at 0.24 (Spence 1979). A two-dimensional map was found to be the most parsimonious and interpretable solution. Adding an additional dimension did not significantly improve stress but worsened interpretability and parsimony. The third and final step of HCA consisted of a re-contextualising qualitative analysis to connect the MDS structures to the

interview data, again using CCA. This step helped interpret the meaning of the MDS patterns by referring back to the interview data in which the MDS structures were embedded.

Results

In our analyses, we identified the intra- and inter-personal, as well as socio-structural environmental dimensions that delineated mobility practices, explored the relations between dimensions of agency, and conceptualised “mobility as agency” from the perspectives of Metrorail users.

Dimensions of Personal Agency

In the first step, we coded and analysed the interview data deductively to explore Bandura’s tripartite agency concept. This entailed identifying intentions, types of agency, environmental facilitators and constraints, action potentials, and desired mobility outcomes. The following example illustrates this analytic step:

I just want to walk down there this afternoon and hope the train will be on time.

... No, honestly, no man, it’s a headache I tell you. No, I don’t even want to think about it. Because you see actually I leave here at 17:15, right? The train is actually supposed to be there at half past 5, but there is no way that I will waste my time and walk quickly because I know it will either be late or it would have left

already. Do you see? So then I rather take the 6 o'clock train. Even if that means I only get there by 18:30. On the other side, the whole fact of the matter is that you need to get home. It doesn't matter what time you leave here, you simply need to get home. How you are going to get there, what time you will get there, that is simply your own damn problem. And it shouldn't be like that. It really shouldn't be like that. (MT3: 3)

Intentions and Desired Outcomes: In this excerpt, agency in relation to mobility began with intentions to be mobile. According to Bandura, intentions consist of the intra-personal cognitive processing of personal needs or desires in relation to anticipated contextual factors and potential desired outcomes. The intention "to get home" connected to what the interviewee perceived as the most significant contextual issue, the unreliability of the train, because it had implications on when he would get home. This assessment enabled him to identify the best course of action – to take a later train. The overarching goal here was to align his intentions with perceived outcomes. Bandura proposed that desired outcomes relate to the extent to which intentions may be realised. Deliberation and making decisions based on when to leave work, when to reach the station, and which train to take assisted this commuter in achieving his goal or desired outcome.

The Environment as a Facilitator or Constraint: The ability to be mobile is mediated by environmental factors. They dictate mobility boundaries and enable or prevent agentive practices. The excerpt above exemplified a late train as a contextual factor that represented an obstacle to the interviewee's ability to be mobile. This situational circumstance illustrates facilitating or impeding environmental factors mentioned by

most Metrorail users in this study. Table 2 below summarises the environmental facilitators and constraints from our interviews.

Table 2. Examples of environmental factors mentioned by Metrorail users.

Environmental Facilitator	Environmental Constraints
Safety	Lack of safety
Comfort	Overcrowding
Cleanliness	Dilapidated, broken-down, and out-dated infrastructure and train stations
Efficiency	Service disruptions
Reliability	Delays
	Unavailability of Metrorail staff and information

Two characteristics are noteworthy in this table. First, environmental facilitators and constraints lie on opposite ends of a dimension, for example, a train that was on time and a train that was cancelled, respectively. Second, interviewees identified many more constraints than facilitators, a predominant trend in the data since the constraints that restricted agentive practice were far more prevalent not only in frequency but also in terms of perceived significance and degree. This means that our interviewees focused overwhelmingly on experiences associated with constrained mobility environments. The previous and following excerpts illustrate environmental constraints:

I mean we pay, even though we pay less but we pay. There are so many commuters. We buy so many monthlies [monthly tickets]. How much money does Metrorail make? Why can't they do that? Why can't they give us a comfortable, convenient environment to sit in? (MT1: 6)

Another noteworthy dimension underlying environmental concerns is that facilitators tended to be aspirational, hypothetical, or future-oriented, such as a planned expansion of train line, in contrast to environmental constraints, which were presented as common experiences, such as unsafe and unreliable trains during rush hour.

Selected, Constructed, and Imposed Environments: According to Bandura, an important feature of environmental facilitators and constraints concerns gradation of variability. Contextual dimensions are imposed, constructed, or selected. The train delay from the first excerpt was an example of this: the commuter may have decided to take an earlier or later train – an instance of bounded agency – but he lacked alternative modal choices. He does not own a car and cannot afford alternative modes of transport. Consequently, he lacked the ability to select or construct a different mobility environment. This illustrated the impact of an imposed environment since his environment and access to resources dictated the boundaries of his action potential. In this way, environmental facilitators and constraints impose a range of variability within which individuals can respond. All three environments shape actual and potential mobility options.

Individual, Proxy, and Collective Modes of Agency: The modes of agency in the previous excerpts related to perceived abilities to be mobile based on a relational dependence. Bandura termed this proxy agency – when others act on the agent's behalf. Here another example of proxy agency:

So even now, if the car were to break down, I wouldn't even take a taxi. I would just call someone to come and fetch me. Like my nephew or someone. I wouldn't

walk or take a taxi, not unless I really have no other choice. But that just goes to show how convenient and comfortable my life has become. (MT9: 1)

The interviewee did not elect walking or using a taxi because she considered these modes inconvenient or unsafe in relation to another option. She constructed an alternative mobility option by enlisting someone else, a proxy agent (“I would just call someone to come and fetch me. Like my nephew or someone.”). In our data, the most frequently mentioned proxy agent was Metrorail. For example, an interviewee wished he could rely on this proxy to act on his behalf [“How you are going to get there, what time you will get there, that is simply your own damn problem. And it shouldn’t be like that. It really shouldn’t be like that.” (MT3: 3)]. Commuters frequently expressed their desire for Metrorail to act as a proxy agent to improve their train experiences, such as requests to increase the frequency and the reliability of trains, to enhance the convenience and comfort of trains, or to improve safety and security.

Individual agency relates to instances where commuters deliberately guided their behaviour *via* mobility options at their disposal. Some commuters reported that Metrorail was their only mobility option, while others were able to limit train use to weekday commutes and made use of alternative mobility modes in other life spheres. In some cases, the obstacles commuters encountered resulted in abandoning Metrorail. For most, Metrorail was the least preferred mode of mobility and the first to be replaced, if other modes became available. Here an example:

So, I take [Metrorail] regularly. Yea, yea, yes, I take it Monday to Friday, weekends I don’t bother with the trains at all, like I’ve told you. We prefer to take

the vehicle on the weekend of course it is going to work out more expensive but you can do so much more with the vehicle because then you can do your shopping and things like that. You see, because I am actually one of those fortunate ones because those other people have to also do their whole shopping with the trains, right? They are not as fortunate as some of us. But of course it costs a lot of money. (MT3: 6)

Collective agency refers to acts of interdependent effort that enabled individuals *via* groups or a collective to achieve a goal. In the case of our Metrorail commuters, collective agency referred mostly to the activation of social ties, often based on religious, friendship, or work networks that developed during train commutes. Here, an example:

...the positive thing that I learned out of [being unable to afford a car] was that God wanted to place me among people because He knows my heart and He knew that I have a need that burns inside of me to serve Him, and this is why I was short of money. But I have become richer in Him because now I have a social group that I have every day, they can feed me, they can give me provisions for the road, they can comfort me and this is really the thing that stands out the most for me about taking the train because I learn every day and I realise every day and I become wiser every day through them because I take the train. (MT1: 4)

Table 3 summarises the modes of agency of Metrorail users.

Table 3. Summary of the modes of agency mentioned by Metrorail users

Individual mode of mobility	Collective mode of mobility	Proxy mode of mobility
Metrorail	Religious networks	Metrorail
Buses	Friendship networks	Family members
Taxis	Work-related networks	
Privately-owned vehicles	Car/lift sharing arrangements	
Walking		

Action Potential: Modes of agency, environmental facilitators, and constraints and the ability of commuters to assess agency according to their environment relative to their capabilities, intentions, and desires contributed to action potential. The action potential manifested positively or negatively, depending on how these dimensions combined. Positively framed, the reciprocal interaction between agentive and environmental dimensions enabled commuters to achieve their mobility goals. Negatively framed, some commuters were unable to overcome obstacles to mobility, based on environmental constraints or a lack of agency. Their action potential was restricted and their mobility desires remained unfilled.

In this analysis, we connected Bandura's proposed dimensions of agency and environment to the mobility practices of Metrorail commuters and found that all dimensions were present in the narratives of Metrorail commuters. Next, we examined the interdependence between these dimensions.

Systematising the Interdependence of Dimensions of Personal Agency and Environment in the Reported Mobility Practices of Metrorail Commuters

The narratives on mobility experiences were composed of unique constellations of intentions and goals, facilitating or constraining environmental factors, and modes of agency. While the first set of analyses examined the presence of dimensions as outlined by Bandura's triadic reciprocal causation model, mapping them systematically deepened our understanding of agency in a specific mobility environment. To do this, we used a dimensional analysis, specifically MDS, to map the relations between Bandura's agentic dimensions and to visualise mobility structures in an n -dimensional space. The representation of relations was facilitated by dividing the dimensions' action potential and desired outcome into positive or negative constituents – action potential positive and action potential negative, and desired outcome achieved and desired outcome impeded. Mapping patterns of agency in a specific mobility environment revealed distinct patterns of reciprocal interaction between agentic practices and environments. We present this in Figure 19.

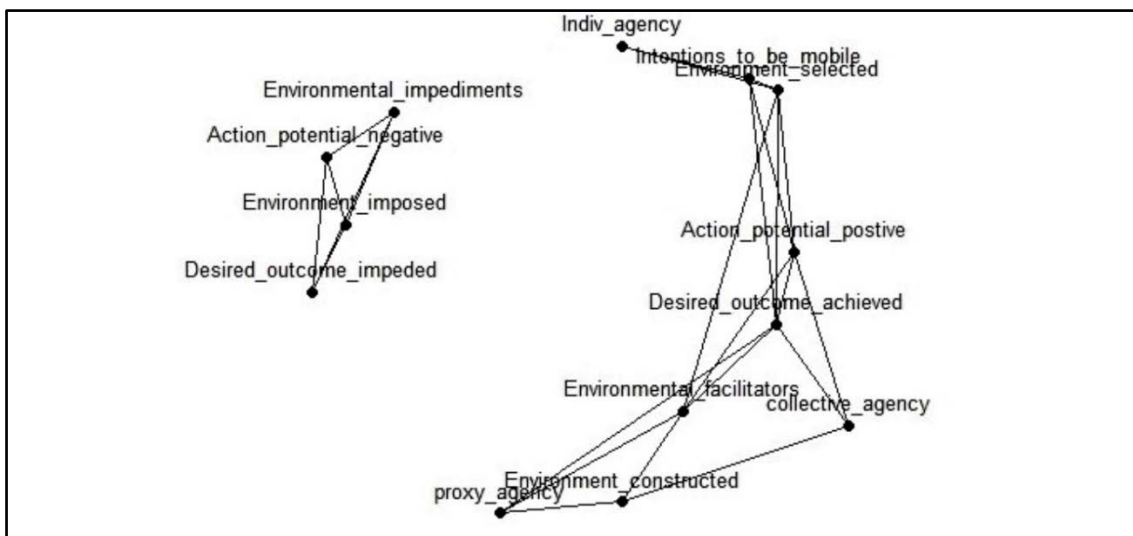


Figure 19. MDS map of the agentic practices of the Western Cape Metrorail commuters.

Represented in Figure 19 are the dimensions of agency and environment as points in a two-dimensional space. The distance between points represents the relative frequency or co-occurrence of dimensions in the interview data. The closer the points are located to each other, the more frequently the dimensions co-occurred. Conversely, the further apart these are, the fewer the co-occurrences, and the more orthogonal the dimensions are to each other. Consulting the interview transcripts assisted the interpretation of this map.

According to Figure 19, the agentic practices of Metrorail commuters are divided into two main clusters: a small cluster on the left, which we will refer to as cluster 1, and a larger cluster on the right, cluster 2. Linking the top 30% of co-occurrences with a straight line visualises the two-cluster structure. The second notable feature relates to the shape of the clusters. The dimensions of cluster 1 are situated in close proximity to one another. Each component connects to all others in this cluster. Except for one dyad, the points in this cluster are roughly equidistant to each other. The elongated, crescent shape of cluster 2 on the right indicates that the dimensions in this cluster are connected. In contrast to cluster 1 there are some interpretable differences in this cluster, given the relative distance between the dimensions situated at the top and bottom of the crescent. Finally, the elongated shape of cluster 2 is approximately equidistant to cluster 1. Five notable findings can be inferred from this map.

First, cluster 1 includes four dimensions: environmental impediments, a negative action potential, an imposed environment, and the impediment of a desired outcome. This is interesting because the cluster contains all dimensions, which restrict agency (imposed, impeded, and negative). These dimensions are highly interdependent, given not only the geometric proximity of the points but also their connectedness. This cluster is

geometrically and thus conceptually different from the other agency and environment dimensions. Based on the content and location of this cluster, we observed that the challenges and obstacles that impeded mobility agency and practices of the Metrorail users were intertwined. These included references to their imposed mobility environment, such as dilapidated infrastructure or inadequate services, as well as environmental impediments, such as delays and breakdowns in the system. The consequences connected to these obstacles were negated agentive practices and inhibited desired outcomes as they resulted in restricted agentive practice. Given the relative distance to personal, proxy, or collective agency, this cluster represents the opposite of agentive practice – the lack of agency. The following are two excerpts to illustrate the nature of cluster 1:

There were some days, sometimes when people have stolen the power cables. So then, people can't go to work for at least a day or will be late by two or three hours. So yes, I think this is actually a terrible experience, especially if there is work to be done. They steal the cables a lot, yes. (MT2: 2)

For example, yesterday morning. My train is at 5:45AM. No announcements, nothing. The train arrives at 6:30AM. Do you see? Now I have to let the people at work know that the train is late, but they don't understand. It's very frustrating. (MT3: 1)

Second, individual agency is located at the top point of the crescent in cluster 2. It connects to intentions to be mobile and the selected environment. Both dimensions are connected to a positive action potential and achieving a desired outcome, while a selected environment is further connected to a facilitating environment. Three characteristics can

be observed in this part of the figure: 1) Individual agency seems to be a cornerstone of a network of connections between mobility dimensions. This part of the constellation implies that individual agency involves a number of core features including intentions to be mobile and the ability to select an environment that facilitates the action potential of the individual to achieve a desired outcome. 2) The dimensions of this part of the cluster are active and positive manifestations of agency. 3) This agentic pathway is similar to the classical understanding of personal agency, where individuals (in our case, commuters) are full agents in the sense that they have different (mobility) options. Here an illustrative excerpt:

I mean, it's so many commuters, I mean, me coming from the sustainable side, that's what I'm all about that, I'm all about green living. I prefer using public transport. I have a vehicle but coming to work, I use public transport. Even if it means a taxi or bus, I use it because, I mean, more people in one vehicle, automatically we'll be saving the environment slowly. (MT24: 1)

For this commuter, individual agency shaped mobility. It transcended commuting from point A to B based on imposed options. Instead, it included an overarching goal of living a greener, more sustainable life, resulting in a concerted effort to utilise mobility options that made this a viable agentic option. Accordingly, the commuter adapted her mobility choices and selected an environment that best suited her desired outcome.

Third, proxy agency is located at the lowest point of cluster 2, which is closely associated with a constructed environment. Proxy agency is also connected to environmental facilitators and achieving a desired outcome. Similar to the constellation located at the

top, we identified an agentive pathway at the bottom of this cluster. In this part of the constellation, proxy agency is associated with the ability to construct an environment on behalf of commuters. Interestingly, this agentive pathway is not directly connected to the action potential of commuters, a point we will return to later. The examples mentioned previously that related to Metrorail acting on behalf of commuters, or reaching out to friends and families during emergencies, were indicative of this agentive pathway. Here another example:

Stick to time, and send out notices, like if they know people are using trains regularly, like if there's a delay, send SMS's to people, you know, be like "the trains will be delayed like an hour," like give me a choice, help me decide if I want to take the train or a taxi, maybe I could've compromised or made another option, but now I don't know, I get there, now I wait, and it's like five minutes, then you wait, then it's like forty minutes, you know, so yeah. Like, let people know. (MT32: 3)

Fourth, the final type of agency in Figure 19, collective agency, is located near the centre of cluster 2. It is connected to three agentive dimensions, namely the construction of an environment, a positive action potential, and achieving one's desired outcome. This constellation implies that collective agency consists of a co-construction of mobility environments through interdependent efforts, which increase the potential for agency. This agentive pathway is interesting for several reasons. In contrast to individual and proxy agency, which are situated at opposite ends of this cluster, collective agency is located centrally, close to achieving one's desired outcome. The proximity of these two dimensions indicates that this agentive pathway is closest to Metrorail users achieving

their desired outcomes. Nearly equidistant from proxy agency and individual agency, it also implies that it shares some characteristics with these. It appears that collective agency is made up of individual and proxy agency while being more effective than the single individual or the proxy agent.

Fifth, and as a consequence of the above, it is more appropriate to think of this agency cluster not as a crescent but rather as a continuum, where collective agency represents the mid-point between individual and proxy agency. One way to make sense of this is to consider the locality of agency along this continuum. At the top, Metrorail commuters are directly involved as individual agents in determining their mobility outcomes. Here, agency resides in the individual and represents deliberate personal action (the “I” and “me”). At the bottom, people are only indirectly influencing the outcome as they rely on someone else to act on their behalf. Here, agency and the ability to achieve a desired outcome reside with a proxy (“they” and “the others”). In the middle, agency is shared through interdependent effort as part of the collective agency pathway (“we” and “us”). The reason for this elongated cluster to bend into a crescent around the smaller cluster 1 is that all three interconnected agencies are different from, and thus maximally distant to, the non-agentive cluster 1. Finally, despite their commonalities, the modes of agency are relatively distant from each other, which supports Bandura’s argument that individual, proxy, and collective agency are different forms of agency. This difference is due in part to the distinct patterns of reciprocal interaction between the psychosocial and socio-structural environmental dimensions of agency. The illustration of this difference in agency types and their differential relation to environments was one of the goals of this analysis. According to the MDS results, we found that mobility as agency from the perspectives of Metrorail users consisted of three distinct agentive pathways, which were

differentiated not only in terms of the locality of agency but also in how they related systematically to different mobility environments.

Mobility as Agency: The Agentive Pathways of Metrorail Commuters in the Western Cape

In this analytic step, we re-contextualised key patterns in the MDS map according to HCA (Bergman 2010), which allowed us to better understand the meaning of the MDS patterns as described above.

The Individual Agentive Pathway: How did Metrorail commuters achieve individual agency, considering the many challenges inherent in the mobility system? Re-contextualisation revealed that commuters primarily used the individual agentive pathway to overcome or avoid Metrorail's weaknesses, which included alternative modal choices to overcome delays or breakdowns, such as borrowing or buying a car, or using buses or taxis, where available. Here are some examples:

Um, people get into trouble at work because [the trains] are always late. Often I can go back and fetch my car and go with my car but many thousands of people don't have a car that they could take. This is their only transport. I use it because it is cheaper and because I can read while on the train. I can't read while I am driving. (MT5: 2)

It's ridiculous. I mean I used to use the railway but you cannot get to work late. I mean half-an-hour late, more than three times within a month and blame it on

public transport. I mean after a while, I'm very sure, that your employer thinks it's your fault. (MT24: 1)

Interviewer: Why don't you take trains more often?

Interviewee: Really? No way, no, no. The thing is, like, if there is a possibility, I would not take a train, if I had a substitute. I would rather take the substitute. But the thing is, this is the cheapest form of transport. But preferably I would rather go by the car. Unfortunately, which I don't have, but that's not, no. (MT20: 7)

An interesting variant of this agentic pathway related to commuters exploiting systemic weaknesses to achieve desired outcomes, as illustrated by this excerpt:

Cause if, say tomorrow, a better service than the trains were to come at an affordable price, I promise you, people would stop using the train. It's just that it's affordable and it's easier to use a train, when you don't even have money or a ticket for some people, because I know guys who live in my street and they wake up early and they leave at four to go to the train, they catch the train for free and then they come back after eight – there's no guards or anything. So, they don't buy tickets; they just ride for free. (MT15: 7)

Getting up very early and coming back late at night, or returning home to fetch one's car when a train is cancelled are examples of how individuals used selected environments to adapt to challenging situations to create viable agentic options. However, such individual agentic practices were exceptional because only a small number of

commuters in our sample had access to a car, or were able to commute early or late enough to avoid certain environmental obstacles. Most commuters travelled during peak hours and reported feeling trapped in a deficient mobility environment, since they lacked the means and access to viable alternatives. The majority of mentions connected to this pathway were related to expressions of preferences, wishes, and aspirations; they referred to what commuters wished they had.

Interviewee: I don't know, if you know the movie "The Italian Job?"

Interviewer: Yes, yes...

Interviewee: Did you see that scene where they're sitting in that train that looks like a spacious, expensive one. Wouldn't you wish to be there, like to use that train as a form of transportation?

Interviewer: Yeah, of course. But that's in the movies.

Interviewee: Yeah, that's what I'm saying. You only see them on TV and you wish, why don't we have that, you know? If they're coming up with something new that you'd wish, that you'd use as a substitution for your trains. It's either not around you, or it's too expensive for you. For instance, the Gautrain, that's a nice train, you know? But where is it? It's only in Gauteng, not around South Africa. And certain people use it, not everybody is using it, you know.

Interviewer: What do you mean with certain people?

Interviewee: People of that region. People who can afford it. Because even there, not everybody is using it. It's people who can afford it, because maybe the prices are high, I don't know, but why do they not make it for all of us. Not like the trains that we're using now. (MT25: 9)

The re-contextualisation revealed the limitations of the individual agentive pathway. The ability to choose from a variety of mobility options that facilitate agentive goals tended to be unrelated to daily commuting experiences. Instead, this agentive pathway was predominantly aspirational, confined to wishes or outcomes that manifested in an imagined present or distant future.

The Proxy Agentive Pathway: In the proxy pathway, commuters often looked to other agents to act on their behalf. The initial analysis revealed that proxies included, most prominently, Metrorail, but also close family members and friends, lift clubs, and members of personal networks. A re-contextualising analysis showed that common to all proxies was an ability to construct a new or different mobility environment for commuters. This was obvious when considering the facilitating effect of a lift club, a ride with a work colleague to or from work, or being rescued when stranded. In relation to Metrorail, however, the agentive pathway was obfuscated. While expectations toward the mobility environment were often clearly communicated, facilitating environments rarely materialised as commuters reported that Metrorail was either unwilling or unable to intervene on their behalf. Here are some examples:

Interviewee: Um, I think it will just become more and more neglected. The whole train network will just become more and more neglected.

Interviewer: Why do you say that? *Interviewee:* Because all the signs are there that there is no focus on maintenance. I don't think that Transnet [the State holding company of Metrorail] or Metrorail or whoever has the ability to do it and I also think that they don't have the money to maintain everything or to keep

it at an acceptable level. So that's the picture that I see – a negative picture...

(MT21: 3)

So they really need to implement something of that kind to improve their service. They really need to, they really need to improve their service. Funny enough, I actually saw the other day in the Argus [local newspaper] that they are planning to, but you know they always make plans and make plans and make plans and nothing ever comes from it. The Minister of Transport has just the other day, there was an article in one of the newspapers, they are planning to do something but they never get so far as to actually deliver anything. So, it's really, it's really a problem you know. It is a big problem and unfortunately this is the way it is...

(MT3: 3)

Interviewer: So, what do you think will happen in the future?

Interviewee: In this current state? Nothing. If nothing happened for two decades, what will change now and in the future? I believe it was two years ago you know our president? They bought new trains, but I think it was too high, I believe. Or couldn't fit on the railways or something, but I believe it was the wrong trains or the trains were not engineered for our railways, whatever, something was wrong, I believe it was too high, I'm not sure. [...] So, nothing happened, still the same. The only thing that changed is that they made the tickets more expensive. (MT20:

8)

While commuters' hopes and expectations illustrated how the proximal agentic pathway ought to function, many examples from the data also indicated that their lived experience differed considerably. This helps to explain why the dimension of action potential is unconnected to this pathway. The breakdown in the function of this agentic pathway emphasised the challenges inherent in the mobility system.

The Collective Agentic Pathway: In relation to the challenges intrinsic to the Metrorail system, collective agency was perhaps the most informative and successful of the agentic pathways. Given that it is maximally distant to cluster 1 (containing all socio-structural environmental constraints and negative situational circumstance associations of mobility) in Figure 19, we can assume that it was the most functional of the agentic pathways. A re-contextualising analysis of this agentic pathway revealed why this is the case. Collective agency was most frequently associated with social networks that commuters activated. These "cliques" consisted of friends, colleagues, or religious circles formed by commuting together. Here an example:

Interviewee: And there are also these cliques that form on trains. So everyone knows when they get on that this is their group that they chat with until they get off.

Interviewer: Do you have a group?

Interviewee: Yes, we have a group that meets in the mornings and we have church services on the train. So we are a group that meets on the train in the mornings and then hold a nice church service until we reach Stellenbosch station, until we get off at our station. There are a lot of networking groups and social networking

groups that have formed because of it. And as a group, we also make sure that we meet once a month and go out for something to eat. (MT1: 2)

The functionality of these groups linked to a supportive or protective role they played in the lives of commuters. Not only did they support social and cultural activities, but they also provided safety and comfort to commuters confronted with uncomfortable, unreliable, and potentially dangerous commuting environments. In this way, the collective pathway helped to construct a protective buffer between commuters and the uncomfortable or potentially hostile mobility environment. Here are some examples:

Nothing bad has happened to me personally because I always travel in a group. It is a lot better if you travel in a group. And that's the other thing when you take the train a lot then you meet and get to know people. And then people know you travel at that time every day and then you can sit in the same carriage and then you develop relationships like this. I have a group that I take the train with every night. And like when someone isn't there you would message them and say "Where are you?" or "Are you late?" and so on. (MT4: 4)

So there is usually the thing that if I travel on a train then I need to be in a large group, large group being five or more people, safety in numbers. (MT27: 4)

I also once, it happened in the morning. I was writing [exams] that morning. So the trains were delayed and there had been delays from early in the morning. I had no other option 'cause it was internal exams. With internal exams my teacher shows no mercy. If you're late, you're late, you're not gonna write. And it was

June so I needed the marks to apply to University. People started [she claps her hands loudly], the train came and people started to get on. I tried to get on, I tried, I fought and I fought. Then I could, one foot was on but the other foot was not. My bag was outside, my face was inside. I was holding on by the doors there, you know, onto the frame. I was holding by the door frame, so when the train was about to approach Bellville, it makes a turn but like a huge turn. I almost fell. If it was not for the person that was next to me, but a bit to the inside, I would have fallen. 'Cause this guy saved my life, he just grabbed me by my shirt and tie and held onto me. And then I couldn't breathe because I have asthma. I had already given up, I was going to die. But he pulled me in and other people also noticed that I was fainting. There was, I don't know what happened, I don't know where the people went, there was space, they made space. I was able to lie down and then they gave me a space to breathe, but I almost died. (MT15: 8)

The Function of Agentive Pathways: As stated earlier, individual, proxy, and collective agentive pathways lie on an agentive continuum. We found that these pathways varied according to the socio-structural, environmental impositions commuters experienced. Individual agentive pathways, for example, allowed individuals to respond to environmental constraints by selecting different mobility options to overcome or avoid problems and therewith created viable alternatives. Another strategy involved activating the proxy agentive pathway, which aimed to secure the help of more powerful actors, such as Metrorail or the government, to improve the mobility environment and to overcome socio-structural environmental impositions on behalf of commuters. While both strategies should have theoretically enabled someone to address, overcome, or avoid environmental constraints, few

commuters were able to effectively implement personal agentic strategies to avoid Metrorail and most attempts at proxy agency seemed to fail at least in the short run to activate Metrorail or the government to improve regular commutes. It is within this context that the function and relative success of collective agency became most apparent. While collective efforts may not have been able to change the environment – they cannot prevent trains from being late, or services from being disrupted, or *skollies* and *tsotsis* (loosely translated, gangsters or criminals) from boarding trains – through interdependent effort, they provided a protective buffer that enhanced the action potential of commuters. By constructing an environment that offered resource and information sharing, coping mechanisms, and strength in numbers, this collective effort often provided the most functional agentic pathway of Metrorail users during their mobility encounters.

Discussion and Conclusions

The purpose of this article is three-fold: to explore empirically Albert Bandura's dimensions of agency and environment using the model of triadic reciprocal causation, to examine mobility as agency among Metrorail users in the Western Cape from this theoretical perspective, and to explore ways in which conceptions of mobility need to integrate technical, socio-structural, and psychosocial components in order to offer a context- and culture-sensitive approach to sustainable mobility. In applying Bandura's framework, we identify empirically all intra- and inter-personal, as well as psychosocial and socio-structural dimensions that are part of his theory. We find that Bandura's agency

concept serves as a suitable analytic framework to systematise commuting experiences and practices among our Metrorail users. Mapping patterns of reciprocal interaction between agency and environment dimensions to study the interdependence between agentive dimensions enables us to visualise how mobility as agency unfolds along distinct pathways relating to individual, proxy, and collective agency. Agentive pathways lie on a continuum as agency moves from the individual to the proxy, with the collective occupying a central position. Another way to understand these agentive pathways refers to the function they serve in relation to the types of mobility environments. While the individual agentive pathway is closest to the classical understanding of personal agency or self-efficacy, and therefore representative of mobility achieved, in the context of Metrorail users, it remains largely aspirational, given that few of our commuters have access to alternative mobility modes. Proxies, such as Metrorail and the government, are critical to creating and mediating the mobility environment, and their failure to do so contributes to the restrictions and frustrations associated with the mobility system. In the context of Metrorail commuters in the Western Cape, it is the protective buffer of collective agency that enables commuters to achieve most consistently mobility as agency.

With regard to our first objective – to expand the concept of personal agency beyond the confines of unidirectional modes of causation adopted in studies on personal agency and self-efficacy, our application of Bandura’s framework of reciprocal causation shows that mobility as agency is inherently psychosocial and functionally dependent on technical and socio-structural dimensions. While our study supports evidence for the one-dimensional, intra-personal individual agentive pathway conventionally pursued in studies on personal agency (Bores- Rangel et al. 1990; Church et al. 1992; Ryerson 1994;

Hackett & Byars 1996; Bandura 1997, 2004a; Langlois et al. 1999; Rogers et al. 1999; Gibson 2004; Chapman-Novakofski & Karduck 2005; Hill et al. 2009; Tougas et al. 2015), we also identify other agentive pathways. To our knowledge, this is the first empirical exploration of the model of triadic reciprocal causation as proposed by Albert Bandura, and our study provides evidence for a more nuanced understanding of agency as distinct and systematic patterns of reciprocal interactions. Although our study is limited to a specific context – Metrorail commuters in the Western Cape, Bandura’s framework of triadic reciprocal causation and the mixed methods framework we adopt here serve as effective analytic tools to examine empirically this theory. Future research on agency and mobility in this vein ought to examine train systems and populations that differ in agency, environment, or region, or to study personal agency beyond mobility contexts to systematise how agentive pathways function more generally.

In contrast to some of Bandura’s critics, we find that the relative looseness of his concepts and their interdependence (Tschannen-Moran & Hoy 2001; Garvis & Pendergast 2016) prove to be an advantage. It enables us to use the model of triadic reciprocal causation to examine the interdependence between commuters and their environment without imposing *a priori* relationships. While Bandura defined the three types of agency and three types of environments, he did not define or operationalise how they are connected, arguing that this would vary according to context, culture, and other behavioural predispositions. Consequently, we could use the experiences of Metrorail commuters to identify how they and their environment shape mobility as agency, and how this functions in the context of Metrorail in the Western Cape. Given that agency is mediated by a constellation of contextual and cultural influences, the variability embedded in Bandura’s

model provides an excellent framework to study personal agency in different settings, something future studies should pursue further.

The situated application of the model of triadic reciprocal causation expands what sustainable mobility may mean in a specific mobility context. To date, most studies in the mobility domain are limited to either intra-individual or structural concerns (Bergman et al. 2014; Bergman & Bergman 2015; Cass & Faulconbridge 2016), focusing on either infrastructure (Novaco 2001; Brög et al. 2004; Hunecke et al. 2007) or commuter preference and behaviour (Novaco 2001; Steg & Vlek 2009). When we examine the links between intra- and inter-personal, as well as socio-structural environmental dimensions of the Metrorail commuters we interviewed, our study concurs with Shepherd and Marshall (2005) findings that mobility practices are nested within an interdependent network of individual, social, and environmental factors. The reciprocal interactions between these dimensions have consequences on the day-to-day practices of commuters, and they highlight the weakness of policy approaches that fail to take this into account (see also Charlton 2004; Steg & Gifford 2005). Our study makes an empirical contribution toward systematising the distinct patterns of reciprocal interaction between preferences and behaviours in conjunction with a specific context of a mobility environment. Based on our analysis of Metrorail commuters, we suspect that sustainable mobility policies aimed solely at individual behaviour change or environmental and structural barriers are likely to have only limited success because the Metrorail environment is insufficiently aligned with different types of agency. They tend to lack the necessary attributes to enable a positive action potential, and in their current state, they do not connect sufficiently with the context and culture of commuters. Accordingly, we can make two policy recommendations: Individual commuter preferences and behaviours

need to be conceptualised and understood in relation to a specific context and culture of mobility environments when formulating mobility solutions. And mobility interventions need to carefully blend hard and soft policy approaches while considering agency in a specific environment. Whereas most mobility approaches rightfully stress the importance of safe, reliable, and affordable public transport, they neglect what these three characteristics mean *in situ*, for example for employed or unemployed women living in townships or informal settlements. A mobility system that integrates contextual and cultural sensitivities would present a formidable baseline for agency beyond transportation. Our study invites policy makers to think in more complex ways about mobility systems. For example, in the South African context, the low prestige of train travel in relation to the high status of car ownership, particularly for males, needs to be considered when developing mobility solutions that integrate technological as well as motivational and emotional components. The agentic pathways we studied here reflect the constellation of psychosocial and socio-structural environmental dimensions, which make up the mobility context of Metrorail commuters in the Western Cape. This context is characterised by extreme environmental constraints: overcrowded, dilapidated, outdated, and often unsafe trains and train infrastructure. Perhaps the most significant limitation to our study is its small scale and its specific Western Cape context, and future studies with a larger sample size could examine in more detail structural, contextual, and individual differences. While our study is thus not generalizable to a research group or geographic region, it nevertheless reveals how a theoretical framework serves well to illustrate different types of agency and their association with different types of mobility environments. Often, the ineffectiveness of a policy approach is best understood by transposing general policy assumptions into a specific context. Thus, in addition to this accomplishment, our study presented a thick description (Geertz 1973) of everyday

experiences of commuters in the Western Cape along a sophisticated psychological framework. Finally, our study highlights a promising approach for improving sustainable mobility systems beyond hard or soft policies. Removing obstacles that prevent agentive practices and taking into consideration different types of environments represent important steps toward developing context-specific and culture-sensitive sustainable mobility strategies.

“Nowadays, to say that we are clever animals is not to say something philosophical and pessimistic but something political and hopeful – namely, if we can work together, we can make ourselves into whatever we are clever and courageous enough to imagine ourselves becoming. This is to set aside Kant’s question “What is man?” and to substitute the question “What sort of world can we prepare for our great-grandchildren.”

(Richard Rorty 1998, p. 175)

CHAPTER SIX

Discussion and conclusion

Introduction

The overall purpose of this thesis is to explore the contribution the field of psychology can make to developing sustainable mobility solutions that transcend the limitations of current hard and soft policy approaches. Specifically, an agency approach informed by Albert Bandura's Model of Triadic Reciprocal Causation was used to develop a conceptual framework that can account for the multidimensional interdependence of psychosocial and socio-structural environmental dynamics of mobility practices. Accordingly, the research is framed by three research questions:

- (1) Can mobility as agency as outlined in Albert Bandura's Model of Triadic Reciprocal Causation be empirically identified in the mobility practices of individuals?
- (2) How do these dimensions of mobility as agency interrelate?
- (3) What are the implications of conceptualising agency according to the understanding of sustainable mobility in different cultural contexts?

Overall, the findings from the mobility as agency studies presented in this thesis affirmed the first research question. All theorised dimensions and the various ways they interrelate to form distinct agentive pathways can be identified empirically from the interviews. In this way, mobility as agency provides a sophisticated psychological framework to trace not only what mobility as agency means within a particular mobility environment, but

also to conceptualise how mobility as agency adapts to different types of socio-structural and environmental factors.

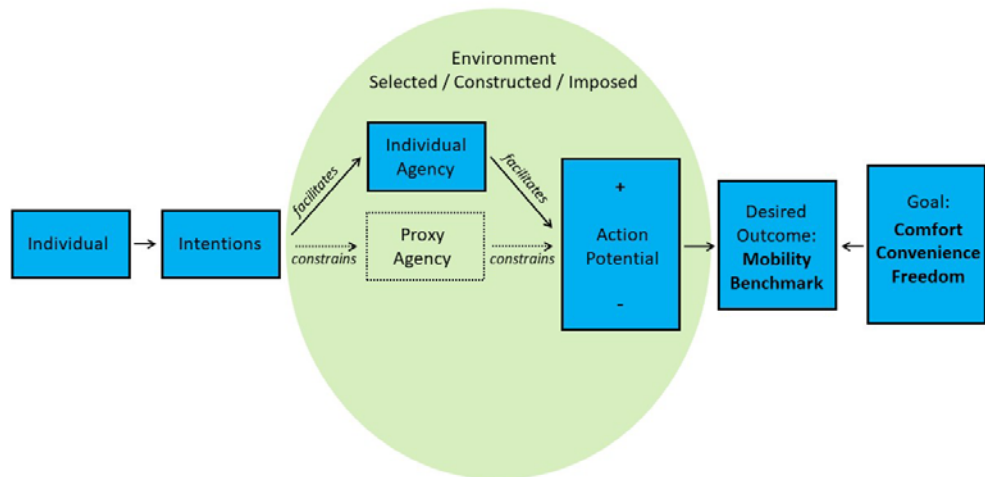
It is through showing how the dimensions of mobility as agency interrelate that the contributions this research makes to the fields of psychology and sustainable mobility are best demonstrated. In the following section, I briefly summarise the main findings in relation to each of these.

Mobility as agency and the field of psychology

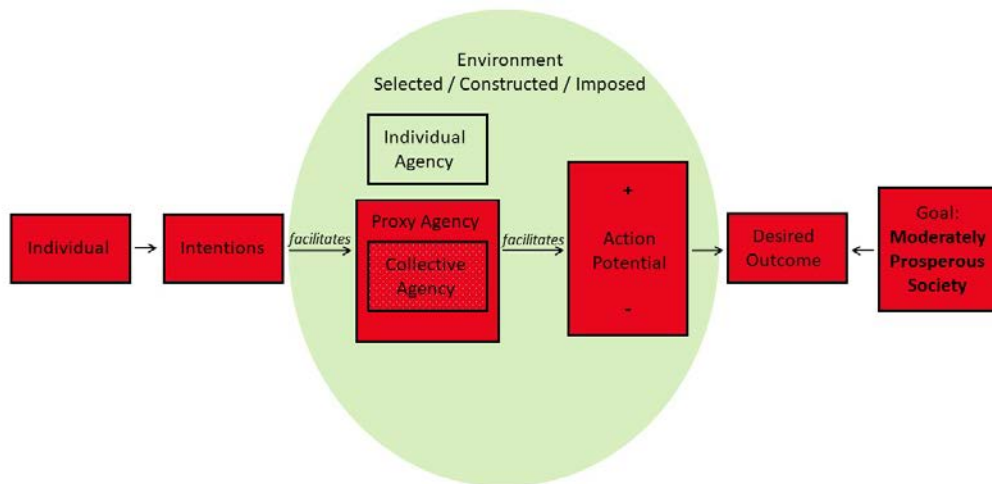
One of the objectives of this thesis was to empirically explore the applicability of Bandura's work beyond the confines of conventional, unidirectional modes of causation adopted in studies on SCT, personal agency, and self-efficacy. Given that individual agency is an integral component of the framework, it is unsurprising that individual practices form a core component of mobility as agency. The research therefore supports evidence for the one-dimensional, intra-personal individual agentive pathway conventionally pursued in studies on personal agency (Bores-Rangel et al. 1990; Church et al. 1992; Ryerson 1994; Hackett & Byars 1996; Bandura 1997, 2004a; Langlois et al. 1999; Rogers et al. 1999; Gibson 2004; Chapman-Novakofski & Karduck 2005; Hill et al. 2009; Tougas et al. 2015). However, using Bandura's concept of personal agency and his Model of Triadic Reciprocal Causation to study the multidimensional nature of mobility practices from the perspectives of car users in regions without developed passenger trains in the US, train users living in Beijing, and Metrorail commuters in the

Western Cape, helps to situate individual agency within a larger framework to include proxy and collective components of agentive practice, as well as the psychosocial and socio-structural environments of daily mobility experiences. This facilitated the identification of additional agentive pathways and showed that mobility as agency was inherently psychosocial and functionally dependent on technical and socio-structural environmental dimensions, which transcended unidirectional concepts of agency (Bergman, Bergman, & Thatcher 2019). This becomes apparent when comparing the results from the three research sites (Figure 20).

(a) Mobility as agency in the US research site



(b) Mobility as agency in the Chinese research site



(c) Mobility as agency in the SA research site

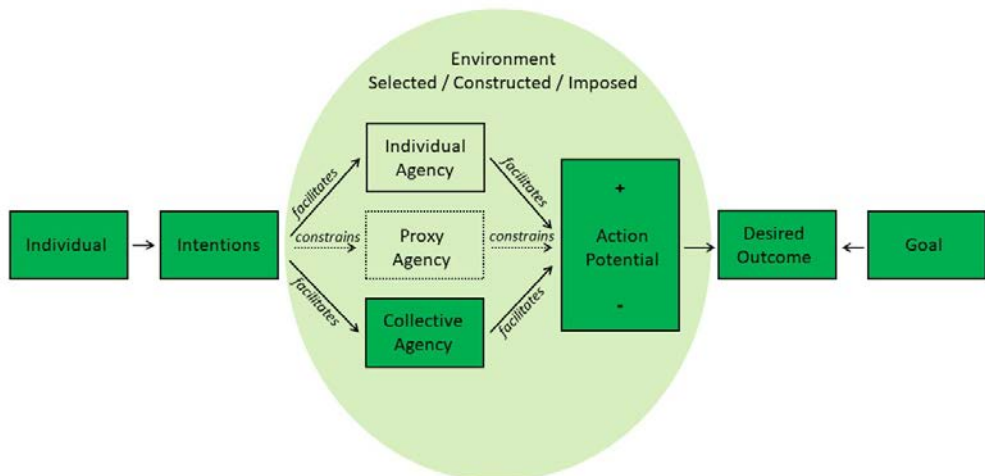


Figure 20. Comparing mobility as agency across the three sites.

The findings show how mobility as agency was not static across different mobility contexts but adapted dynamically to varying individual, cultural, technological, and environmental factors. In the US research site, for example, the individual agentive pathway was the most distinct. It was also connected to environments characterised by the mobility benchmark of comfort, convenience, and freedom. The dynamic interaction between the benchmark environment and individual agency furthermore had a significant impact on the actual and potential function of the proxy agentive pathway. In the Chinese and South African research sites, the individual pathway remained largely aspirational but for different reasons. In the latter case, the individual mobility as agency pathway was desired for the convenience and status associated with car ownership but economic constraints made this an unviable option for most. The difficult mobility environment imposed on commuters and the absence of a proxy to alleviate or counter these challenges added to the disruption and precarity of agentive options. Consequently, the collective agentive pathway proved to be the most functional. For respondents from Beijing, the desired mobility options and aspirations of the individual, while present, was subordinated to a mobility as agency model that centred on the well-being and prosperity of the collective. This was actualised via a proxy agentive pathway, the government, who was expected to develop a facilitating mobility environment through large-scale technological and infrastructural investments.

In terms of the second research question, which sought to better understand how dimensions of mobility as agency interrelated, the research showed how agentive pathways in different contexts were distinct and dependent on a unique constellation of agency and environment dimensions and the dynamic way they interact. These studies showed not only a fruitful application of the Model of Triadic Reciprocal Causation but,

in doing so, provided evidence to support a more nuanced understanding of agency as distinct with systematic patterns of reciprocal interactions between individual practices and different environments (Bergman, Bergman, & Thatcher 2019).

These findings can be extended to the larger field of cultural psychology since, similar to other studies (Kitayama et al. 1997; Morling, Kitayama, & Miyamoto 2002, Uskul, Cross, Sunbay, Gercek-Swing, & Ataca 2012), it is possible to trace various cultural dynamics as part of mobility as agency. The findings from the studies on car users in regions without developed passenger trains in the US and train users living in Beijing were especially illustrative of this strand in the psychological literature. Collective agency, for example, was not to part of mobility as agency among car users in regions without developed passenger trains in the US, and relative to the other studies undertaken as part of this thesis, individual agency was defined in terms of an exaggerated independence. Finally, the strong desires for individual comfort, convenience, and freedom are all considered hallmarks of Western individualism (Bergman 2019; Banister et al. 2007; Steg 2005; Urry 1999, 2004). The study on train users living in Beijing showed that even though individual agency was mentioned, it was unconnected to agentive practice and in deference to the well-being of the collective. Mobility encounters were, furthermore, embedded in values of tolerance, harmony, and solidarity, all of which were considered fundamental components of collectivism and Confucianism as interpreted in China (Bell 2008; Bergman, Bergman, Liu, & Zhang 2015; Zhao 1998; Zhao 2005). Accordingly, studies on mobility as agency across different cultural contexts showed how it was defined and constructed differently, and how individuals responded differently to their mobility environments. On the one hand, it was possible to observe some of the hallmark characteristics defining specific cultural spaces, and on the other hand it illustrated how

the same phenomena – mobility practices specifically and sustainable mobility more generally – were constructed differently in different cultural spaces and contexts. This point will be addressed in more detail in the discussion on sustainable mobility. Important here is that, as Kitayama et al. (1997) suggested, individuals are both products as well as producers of culture and when research conceptualises the relationship between individuals and culture as reciprocal it is possible to empirically trace culture and cultural differences in a meaningful way. Given that cultural difference is something that was strategically pursued in the selection of research sites, the latter is not necessarily a surprising finding. More significant were some of the unique context-specific dynamics, which transcended the dominant cultural characteristics outlined above. I briefly highlight three examples of these culturally constructed realities.

The first relates to the mobility turn in China. While scholars suggest that the fundamental cultural shift introduced via China's rapid technological changes have the potential to undermine its collective cultural foundations (Bandura 2001; Christensen, Raynor, & McDonald 2015; Fukuyama 2000; McGrath 2013; Revill 2012; Schivelbusch 1979; Zuboff 1989, 2015), the study on train users from Beijing showed instead how the government utilised mobility technology to foster existing cultural practices. Train users, furthermore, constructed the mobility system as designed and administrated by the government as part of a fundamental set of expectations toward their government. This is because the implementation of large-scale technological transformations delivered direct and perceived socioeconomic benefits to society through which the government brought into reality the shared aspirations of the collective – to build an inclusive and moderately prosperous society. In this instance, a technological transformation was not situated

outside of cultural practices but was actively integrated and used to orchestrate functioning and desirable cultural norms and values.

The way agentic pathways served specific functions in relation to different environments in the study on train commuters in the Western Cape was another notable example of context-specific cultural dynamics. In this regard, it was especially apparent how constrained environments imposed on individuals shape sociocultural practices. Although individualistic desires for freedom of movement and independence were present in the accounts of commuters, their constrained mobility environment and their limited financial resources resulted in them being unable to realise their wishes, which thus remained aspirational. The overcrowded, dilapidated, outdated, and often unsafe trains and train infrastructure imposed on commuters, furthermore, fostered a collective cultural response as commuters relied on significant others within their social networks to protect and insulate them from these challenges, or to facilitate mobility by drawing on collective resources. In this instance, it was an environmental constraint that fostered stronger collective ties and one wonders if such ties would remain as strong, if the problems associated with Metrorail were addressed or if commuters were able to transition to a higher level on the mobility hierarchy, such as using their own private vehicle.

Finally, studying mobility as agency across three different settings illustrates some of the cultural dynamics defining the relationship between proxy agents and people. The study on train users living in Beijing was perhaps most exemplary since the government explicitly took on the responsibility for the collective welfare, actively administering, promoting, and maintaining the sociocultural model through the development of the public mobility landscape. The relationship between the car users in regions without

developed passenger trains in the United States and the way they portrayed the role of the proxy shares parallels in that the expectation was for the government to maintain the existing sociocultural and car-centric model by providing mobility infrastructure that secured individual comfort, convenience, and freedom. Accordingly, the state and federal governments continued to be committed to fostering individual-based mobility infrastructure in accordance with existing institutional arrangements and expectations by the public. For Metrorail commuters in the Western Cape, the expectation was similar in that the proxy agent ought to have provided mobility options that enhanced individual aspirations and that liberated the poor. It is in the absence of a functioning mobility environment that the collective stepped in to fill the vacuum.

Whether or not proxies are actively engaged in moulding local sociocultural dynamics, these three studies showed how fundamental their roles were in shaping the trajectories of sociocultural models in the mobility domain. While the significant implications this has on sustainable mobility will be discussed in the next section, mentioned in this context is the decisive role of the sociocultural context, something that is surprisingly absent in many sustainability and sustainable mobility models. Much can be learned by comparing the role of the proxy in the US and South Africa, versus sustainable mobility models and achievements in China and India. A further study in India, although not part of the research presented in this thesis, is currently being undertaken in collaboration with the Institute of Public Enterprise in Hyderabad. While the US remained tied and committed to individual-based mobility infrastructure development, and while South Africa seemed committed, at least rhetorically, to the development of mobility structures for the poor, China seemed driven by different sets of goals and interests, which guided investment and infrastructure policies. Depending on these interests and developmental agendas,

different proxies pursued strikingly different mobility strategies and trajectories, which seemed to have a profound impact on the potentials and constraints on sustainable mobility specifically and national economic, political, social, and cultural development generally.

Mobility as agency and sustainable mobility

To overcome the most pressing challenges created by our mobility practices, we need to urgently identify viable solutions that help societies around the world to reduce the social, environmental, and economic costs associated with mobility practices (Bergman & Bergman 2019; Holden et al. 2013). Accordingly, sustainable mobility aims to decrease our dependence on private vehicles (Charlton 2004), encourage the adoption of large-scale public transport such as trains (IPCC 2007), and reduce the environmental impact of individual mobility behaviour (Holden & Høyer 2005). While approaches such as the green transportation hierarchy, may seem effective in addressing the so-called Triple Cs, the first study presented in this thesis showed how they were not viable or are impractical in most parts of the world because they require homogenous availability of technology, infrastructure, and significant economic resources, such as developed large-scale public transport systems. This is often irreconcilable not only with the development needs of many nations around the world, but also with their specific cultures and contexts. Accordingly, the final research question pursued in this research asked how feasible these normative, Eurocentric models of sustainable mobility were in cultures and contexts, which do not align closely with the implicit assumptions upon which many of these

theoretical approaches are premised. Connecting mobility practices and their associations with sustainable mobility in the three research sites presented here provided an evolving answer.

Sustainable mobility from the perspectives of car users in regions without developed passenger trains in the United States

Based on the perspectives of car users in regions without developed passenger trains in the US, sustainable mobility entailed identifying mobility options that satisfy US Americans' mobility expectations – individual comfort, convenience, and freedom. This had profound implications on the potential for sustainable mobility because this benchmark negated the essential foundation upon which sustainable mobility interventions depend – the embeddedness of sustainability values, which place a premium on integrating sustainability issues into the national agenda on the one hand, and the investment in policy interventions that would provide access to more sustainable modes of travel on the other. Given that the horizon of mobility choices became limited to this mobility benchmark, political decision makers had less incentive to implement large-scale change. Given the industries involved in the current status quo and the focus on election cycles, they were more likely to continue investing in existing car-centric infrastructure. Consequently, the potential for developing sustainable mobility in regions without developed passenger train infrastructure in the US faced two seemingly unsurmountable hurdles. The first related to the a priori conditions for behaviour change. As stated in Chapter Three, appropriation of more sustainable mobility practices is conditional on the basis that the government provides more sustainable alternatives that

are inexpensive, do not interrupt current mobility practices and lifestyles, and that fulfill individual benchmark requirements (Bergman 2019). Beyond this, the question of what such sustainability interventions would look like in the vast, low-density landscape of these regions is something that research and policy have not adequately addressed. The resulting stalemate – current institutional norms and values, embedded sociocultural practices, the lack of sustainable alternatives, as well as the cost and impracticality of developing them meant that the most realistic solutions would depend on affordable, gradual innovation of technologies, which do not yet exist and which do not interfere with current lifestyles, expectations, and mobility practices, such as solar-powered cars or planes.

Sustainable mobility from the perspectives of train users living in Beijing, China

While sustainable mobility revolved around securing individual needs in the study on car users in regions without developed passenger trains in the US, in the study of train users living in Beijing, the concept of sustainable mobility was far more expansive in that it connected, on the one hand, to a collective that encompasses family, friends, the elderly, the poor, the uneducated, and migrant workers, and on the other the abstract collective of all Chinese. Mobility was underpinned by a collectivistic mindset with shifting boundaries, and it was embedded in harmony and solidarity (with ingroup members, not to be confused with a Western variant of universalism), as well as shared mobility experiences, aspirations, and desires to achieve a shared, collective destiny. This destiny was to develop an inclusive and moderately prosperous society, and sustainable mobility related to the way the government utilised mobility technology and large-scale mobility

transformations to achieve this. Putting such aims and ideals into practice, the government has developed the largest and most advanced train system in the world, which, beyond delivering direct social and economic benefits to society, was widely regarded as safe, efficient, smart, and environmentally friendly (Aglietta & Guo 2016; Bergman et al. 2020; Bräutigam & Tang 2014). Within this formulation of mobility, sustainability is a national policy embedded in China's Five Year Plans since 2011, which aims to foster society and its sustainable development, and which is implemented and administered by the government on behalf of society.

Sustainable mobility from the perspectives of Metrorail commuters in the Western Cape, South Africa

For the Metrorail commuters in the Western Cape who participated in this study, sustainable mobility related to their aspirations to overcome the failing Metrorail system on the one hand, and to the strategies they utilised to make their daily mobility encounters as safe and enjoyable as possible on the other. Their mobility aspirations could be understood within a tripartite interlocking system defined by the access they had to different types of mobility, their economic positions, and the resulting degree of flexibility to move between different strata in this pyramid (Bergman & Bergman 2019). As a culture-sensitive and context-specific pyramid, it is not a mere reflection of the local interlocking mobility network of the Western Cape but, illustrative of how dimensions associated with safety, reliability, autonomy, and so on converge and define mobility practices and aspirations (Bergman & Bergman 2019). Significantly, if we used this mobility pyramid (see Figure 21 for details) as the reference point for what sustainable

mobility would be in this context, then mobility, even sustainable mobility, pertains to a dependence on or even a preference for fossil-fuelled and individual-based mobility modes, especially private vehicles (Bergman & Bergman 2019). While it may appear counterintuitive to connect fossil-fuelled mobility with sustainability, it is precisely the context of these commuters and the association between mobility and other dimensions of sustainability (such as education acquisition, work, etc.) that introduced this consideration. Lacking the economic resources to implement this pyramid, the interviewed commuters resorted to the protective buffer of their collective family, friends, colleagues, and religious networks to insulate them from the daily challenges and dangers they encountered. Consequently, sustainable mobility was reduced to surviving a precarious mobility environment with the hopes and intentions of escaping into a higher, safer, and more secure stratum of their specific mobility pyramid. This was an important point, since many positions on sustainable mobility equate private vehicle use with negative environmental consequences but also negative social consequences, such as GHG emissions, congestions, and casualties (Banister 2008; Charlton 2004; Geerken et al. 2009; Richardson 2005; Stradling et al. 2000). However, in this context, private vehicle use was associated with safety, security, as well as independence and flexibility (Bergman & Bergman 2019), as well as more successful pursuits in education, healthcare, and the labour market.

Comparing different types of sustainable mobility

It is in bringing these various formulations of sustainable mobility together that we begin to see the fluidity of the concept. Figure 21 presents sustainable mobility from the

perspectives of car users in regions without developed passenger trains in the United States, the perspectives of train users living in Beijing, the perspectives of Metrorail commuters in the Western Cape, and the conceptualisation of sustainable mobility in the literature.

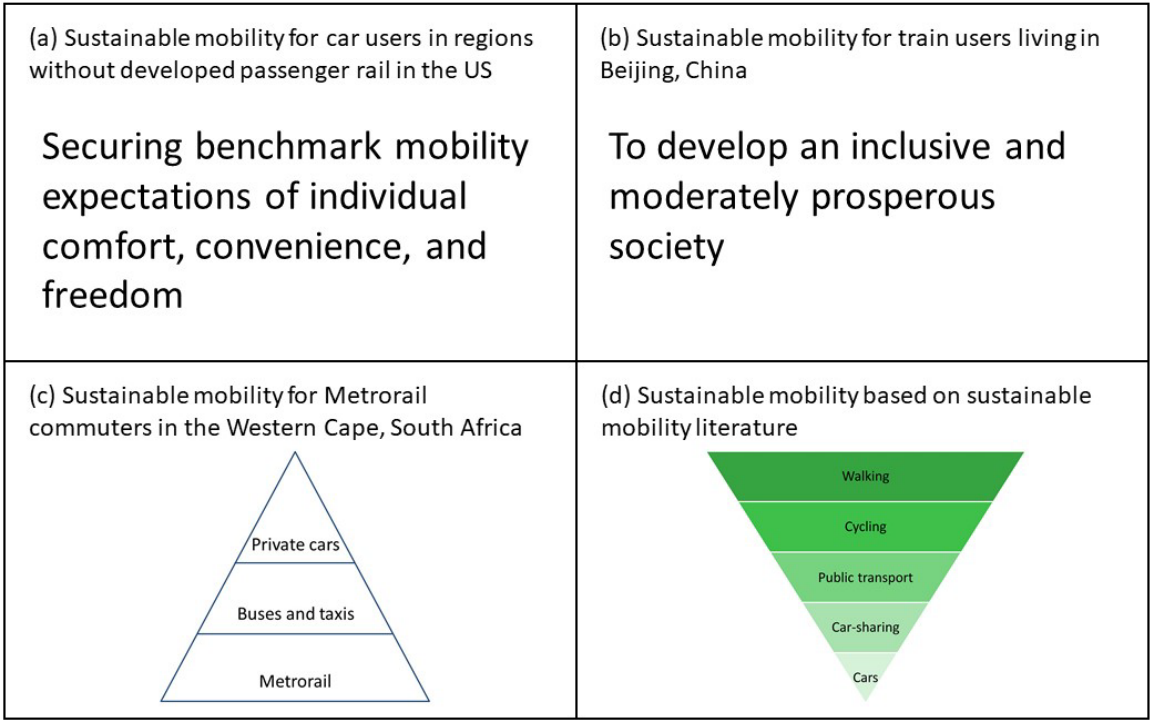


Figure 21. Types of sustainable mobility.

A stark systemic difference emerges when comparing the green transportation hierarchy with other conceptualisations of sustainable mobility identified in the empirical studies presented here. The US and South African cases would not even be considered sustainable by an educated, liberal, urban elite. This raises important questions about what sustainable mobility is or ought to be. How do we, for example, reconcile sustainable mobility as defined within the Brundtland parameters to denote “the ability to meet today’s

transportation needs without compromising the ability of future generations to meet their transportation needs” (Richardson 2005, p. 30) with the lived experiences of Metrorail commuters in the Western Cape? Given that sustainable mobility defined in this way does not support the use of fossil fuel-based modes of transport such as private vehicles, it means that if Metrorail commuters had a choice between a failing public transport system and using their own cars, they should, in the spirit of preserving future generations, choose Metrorail. In reality, the precarity imposed on them with this choice means that they are unable to go to work and may even lose their jobs because they frequently arrive late which adversely affects future generations since their children are less likely to attend good schools, have access to adequate food, medical care, and so on. Similarly, if sustainable mobility based on the green transportation hierarchy (Bradshaw 1992) means to “reduce the need to travel (less trips), to encourage modal shift, to reduce trip lengths and to encourage greater efficiency in the transport system” (Banister 2008, p. 75), how do we expect car users in the vast, low-density geographical landscape of the US who live 30 miles away from their employment to secure their livelihoods?

The limitations of the universal solutions presented in many of these formulations of sustainable mobility stem from their neglect of important values, infrastructure availabilities, geographies, and specific contexts (Bergman & Bergman 2019). In reality, if we wanted to use sustainable mobility models such as the green transportation hierarchy to implement sustainable mobility ideals, then the first step in developing more sustainable societies would require creating societies which are equitable, inclusive, and wealthy, and it would also require a massive top-down imposition of investments, infrastructure development, lifestyle, and consumption regulations (Bergman & Bergman 2019; Bergman & Bergman 2015; Bergman et al. 2014). Furthermore, it would require a

massive migration of the rural population into urban population centres. While this is either a consequence of the proposed theoretical models or an ideal that is at least implicitly argued by most researchers and policy makers in the field of sustainable mobility, such measures simply do not translate into most mobility environments around the world, and it probably will not be feasible to impose them for the foreseeable future. In the interim, sometimes referred to as bridging solutions, the best strategy forward will entail sustainable mobility policies and approaches that can adapt to better reflect local, regional, and national contexts and cultures (Bergman 2019; Bergman & Bergman 2019; Bergman & Bergman 2015; Bergman et al. 2014; Bergman, Bergman, & Thatcher 2019). Based on the findings from the US research site, for example, sustainable mobility solutions will need to consider how this mobility benchmark of individual comfort, convenience, and freedom can be fruitfully connected to interventions, and how sustainable mobility policies are obliged to engage more systematically with what sustainability means in the vast landscape that defines so much of the country. For Metrorail commuters, a plausible solution could entail a massive investment in the existing Metrorail infrastructure or the immediate development of a replacement system that provides at least the baseline of mobility access, safety, affordability, and reliability (Bergman & Bergman 2019). With regards to the latter, it has been argued that there are significant dangers associated with dismantling the Metrorail system and replacing it with a new, efficient one (Bergman & Bergman 2019; Bergman & Bergman 2015; Bergman et al. 2014). The considerable financial investment this would require falls outside of an already constrained government budget and, as the privately funded and operated Gautrain system interlinking selected parts of Pretoria with selected parts of Johannesburg introduced in 2010 illustrates, these systems can be prohibitively expensive and by serving only specific destinations, serve to exacerbate poverty and exclusion

instead of addressing these concerns (Bergman & Bergman 2019; Bergman & Bergman 2015; Bergman et al. 2014). This highlights another important point: in addition to being able to address local, regional, and national contexts and cultures, sustainable mobility theory and policies will need to integrate and bring into balance the economic development of less industrialised regions as a prerequisite for sustainability well beyond the mobility domain (Bergman & Bergman 2019).

While current sustainable mobility theory and policies tend to privilege reducing environmental impact over the necessity for socioeconomic development, this research shows that from the perspective of a developmental logic, environmental concerns are not as salient. Instead, individuals associate private vehicle use with safety, security, as well as independence and flexibility in the pursuit of education, health, work, and social networking. Given that the majority of future mobility development will take place in the poorer and more excluded regions and societies, this particular development logic will be a defining driver of the mobility and sustainability domains more generally, and it will diverge considerably from Eurocentric theories and models of sustainability, which aim to unsprawl, decongest, and decelerate our mobility practices (Banister 2008; Bradshaw 1992; Geerken et al. 2009; Richardson 2005).

The need to bend sustainable mobility theory and policies to connect to local, regional, and national contexts and cultures cannot be overstated. This would help to address some of the major shortcomings apparent in specific approaches, which favour either technical or socio-structural interventions to remodel existing or develop new infrastructure or psychosocial interventions (Bergman et al. 2014; Bergman & Bergman 2015; Bergman & Bergman 2019; Bergman 2019; Bergman, Bergman, & Thatcher 2019; Brög et al.

2004; Cass & Faulconbridge 2016; Hunecke et al. 2007; Novaco 2001; Steg & Vlek 2009). This is because mobility practices are comprised of multiple, interlocking contextual and cultural characteristics that shape individuals' and groups' actual and potential capacity to be mobile (Bergman & Bergman 2019), transcending the limits imposed by contemporary approaches. Our Metrorail study was illustrative of this, which led us to the conclusion that conventional policy approaches that focus exclusively on individual behaviour change or environmental and structural barriers were unlikely to address in a meaningful way the multi-faceted mobility challenges that commuters encounter (Bergman, Bergman, & Thatcher 2019).

A similar argument holds for the mobility context of the car users in regions without developed passenger trains in the US. Here, psychosocial interventions aimed at individual behaviour change are unlikely to be successful because they fail to align with agentive practices, especially the mobility benchmark, or to consider the extensive environmental and structural barriers mentioned earlier. One of the primary findings of this research is that the success of sustainable mobility interventions are contingent on policies that actively and adequately account for such variations (Bergman & Bergman 2019). As mentioned earlier, this would mean finding ways to integrate and account for the mobility benchmark of individual comfort, convenience, and freedom on the one hand and the vast geographic landscape on the other.

Related to the above discussion, the findings from the study of train users living in Beijing offers an exception to the rule since this is the context that comes closest to successfully integrating contextual and cultural sensitivities into the mobility system. By developing the largest and most advanced train system in the world, China has not only embraced

many of the ideals of sustainable mobility, but, by activating and administering the country's mobility potential, the Chinese government has turned this technological transformation into a tool that actively fosters the existing sociocultural and governance model in China. Consequently, mobility and its practice are tied to the perceived destiny of achieving an inclusive and moderately prosperous society as a collective. Sustainable mobility from this perspective turns not on a question of how changes in the mobility domain will impact people's practices. Rather, the driving question seems to be: How do developments in the mobility domain foster the sustainability and prosperity of various collectives (e.g. families, friends, social and work networks) and Chinese society (Bergman et al. 2020)? As we stated in this article:

“Within this logic, sustainable mobility is defined as the spatial displacement of people, goods, technologies, information, or data in congruence with considerations on economic, social, and environmental impacts, and in line with the prevailing or anticipated contexts, culture, and systemic capabilities.”

(Bergman et al. 2020, p. 475):

While the unique position of the Chinese Communist Party as well as China's political orientation make a comparison with liberal democracies difficult, there are nonetheless lessons that can be drawn from the mobility turn in China without the need to enter into a comparison between political and value ideologies. As argued earlier, the mobility turn and the careful and strategic implementation thereof in China illustrates the potential of developing a mobility landscape that strategically blends hard and soft policy approaches in a manner that is culture-sensitive and context-specific, and that explicitly negotiates

and balances economic, social, and environmental components with its systemic constraints and capabilities. Perhaps less palatable to Western sensitivities, especially if contemporary debates on sustainable mobility will prevail, is the sheer amount of top-down governance and investment required to bring into reality this envisioned sustainable mobility in lieu of current dependencies and lifestyle choices around private vehicle ownership (Charlton 2004). With all its shortcomings, especially considering Western sensitivities, the mobility system envisioned by the Chinese government introduces greater efficiency into the mobility landscape (Banister 2008; Holden 2004; Holden & Gilpin 2013), encourages modal shifts to large-scale use of public transport (Banister 2008; IPCC 2007), and reduces the environmental impact of individual mobility behaviour (Holden & Høyer 2005). Possibly more important for some, the mobility system in China contributes significantly to the considerable social and economic development of the nation across nearly all regions and population groups. In the current political climate of most liberal democracies, in contrast, regions or nations seem unlikely or even unable to pursue such a stringent top-down path towards socioeconomic development or sustainable mobility.

Premised on the study of train users living in Beijing (Bergman et al. 2020, p. 475) in combination with the findings from the studies of car users in regions without developed passenger trains in the US and Metrorail commuters in the Western Cape, sustainable mobility can be defined as follows:

Sustainable mobility is the spatial displacement of people, goods, technologies, information, or data in congruence with considerations on economic, social, and

environmental impacts, and in line with the prevailing or anticipated contexts, culture, and systemic capabilities.

In the final sections the main contributions of this research, its limitations, and the scope for future research are briefly outlined.

Theoretical contributions

Contribution to the psychological literature on agentic studies: As mentioned at the beginning of this thesis, as well as in the mobility as agency study of Metrorail commuters in the Western Cape, one of the biggest critiques levelled at studies on personal agency, especially those using SCT, relates to the inherent difficulty in studying personal agency as outlined by Bandura in the Model of Triadic Reciprocal Causation. This is due to the variability of the reciprocal interactions, which exist between the proposed options and conditions (Bandura 2006). Specific criticism relates to the relative definitional looseness of the concepts and their interdependence (Tschannen-Moran & Hoy 2001; Garvis & Pendergast 2016), as well as the conceptual overlap between intentions and outcomes, which have rendered the theory difficult to test (Eastman & Marzillier 1984). Consequently, most studies using the concept of personal agency have reduced the Model of Triadic Reciprocal Causation to a focus on individual agency and the study of the role of self-efficacy in behaviour change (Bergman, Bergman, & Thatcher 2019; Carillo 2010; see for example Bandura 1997; Bandura 2004a; Bores-Rangel et al. 1990; Chapman-Novakofski & Karduck 2005; Church et al. 1992; Gibson 2004; Hackett & Byars 1996;

Hill et al. 2009; Langlois et al. 1999; Rogers et al. 1999; Ryerson 1994; Tougas et al. 2015).

The narrow, selective focus on intra-individual, cognitive dimensions, however, hampers the ability of research to account for individual behaviour in situations, which transcend unidirectional modes of causation (Bandura 1997; Bergman, Bergman, & Thatcher 2019), a limitation that in turn has created the most compelling critique levelled at studies on personal agency (Carillo 2010). From a theoretical point of view, one of the aims of this research was to overcome the limitations imposed by conventional, unidirectional application of SCT by exploring the multidimensional and interdependent nature of personal agency as initially formulated by Bandura and applied within the framework of mobility as agency. Based on the Model of Triadic Reciprocal Causation, this framework accounts for different types of agency, environments, and the potential of different environments to facilitate or constrain agency (Bandura 2006; Bergman 2019; Bergman et al. 2020; Bergman, Bergman, & Thatcher 2019). Using dimensional analyses, such as multidimensional scaling and hierarchical cluster analysis within the mixed methods framework of Hermeneutic Content Analysis allowed for the successful empirical study of dynamic agentive pathways. In this way, the studies presented in this thesis include the role of context and culture in individual mobility practices as part of a reciprocal relationship between technical, socio-structural, and psychosocial effects (Bergman 2019; Bergman et al. 2020; Bergman, Bergman, & Thatcher 2019). Thus, the research contributes evidence to support a more nuanced understanding of agency as distinct and systematic patterns of reciprocal interactions between individual practices and different environments and provides a fruitful approach for agency studies to overcome the

conventional, limited application of individual agency (Bergman, Bergman, & Thatcher 2019).

Contribution to the literature on cultural psychology: The strand of cultural psychology that aligns most with the findings from the research presented here proposes that the relationship between culture and individuals are reciprocal because individuals are continuously engaged in the processes of co-creation in specific cultural contexts (Bergman 1998; Thomas & Znaniecki 1918; Fiske et al. 1998; Kitayama et al. 1997). This reciprocity is based on the idea that individuals are both products as well as producers of culture, thus rendering social encounters as mutually constructed realities (Bergman 1998; Thomas & Znaniecki 1918; Fiske et al. 1998; Kitayama et al. 1997). Research conducted within this vein has found that the same situation is defined and constructed differently by individuals from different cultural backgrounds and that systematically studying these differences helps to identify subtle characteristics that are consistent with the dominant traits of the respective cultures (Kitayama et al. 1997; Morling, Kitayama, & Miyamoto 2002; Uskul et al. 2012).

Similarly, the mobility studies in this thesis also identified hallmark characteristics associated with specific cultures. These include, for example, the hyper-individualistic model of mobility as agency associated with private vehicle use in regions without developed passenger rail in the US (Bergman 2019) and the collectivistic model of agency embedded in mobility as agency of train commuters in Beijing (Bergman et al. 2020). Beyond these similarities, the studies of individual mobility practices across different sociocultural contexts presented in this thesis identified three distinct encounters embedded in mobility practices, which contribute to the cultural construction of mobility

realities. The first relates to the role of the proxy, especially regional or national governments, and their potential scope for producing and enacting cultural dynamics. While the primary interest of cultural psychology as represented by the approach typified by Kitayama et al. (1997) remains focused on individuals and their behaviours, findings on mobility as agency highlight the impact that a proxy can have in this domain and, in certain contexts, an individual-based approach to cultural psychology could benefit from a more collectivistic or group focus by, for example, drawing on iconic works by Benedict Anderson (2006) and Maxwell Takaki (2008), who explored social and societal dynamics outside the field of psychology but still take into consideration the individual or members of social groups.

The second contribution in this domain, and related to the first, is the production of (non-representative) evidence that supports expanding the mutual constitution of individuals and their culture (Kitayama et al. 1997; Fiske et al. 1998) to include environmental dimensions. In the study on mobility as agency of train commuters in Beijing, it is proposed that theories, concepts, and models on rapid technological change incorrectly situate individuals outside of, or overly determined by culture. However, findings from this study suggest that this misses the opportunity to examine the potential of environmental dynamics that align with sociocultural models. Finally, the study on Metrorail commuters in the Western Cape shows that agentic pathways may function relative to specific environments, and the relational and conditional role of culture as connected to environmental dimensions should not be underestimated. In other words, while the thesis contributes evidence to support the mutually shaping relationship between individuals and culture, it furthermore highlights the importance of contextual dynamics as an additional mediator in this process.

Contribution to the field of sustainable mobility: All four studies highlight from different perspectives the important role context and culture plays in defining mobility practices and, by extension, sustainable mobility. By empirically systematising distinct patterns of reciprocal interaction between preferences and behaviours in relation to specific contextual and cultural dynamics of mobility environments, the research aimed to contribute to the field of sustainable mobility an approach that begins to address some of the limitations imposed by focusing on either technical and socio-structural, or psychosocial interventions. Within this novel approach, sustainable mobility is formulated in relation to the reciprocal interactions between context, culture, and individual mobility practices and the research shows how the unique constellation of psychosocial and socio-structural environmental dynamics that define mobility practices require a careful blending of hard and soft approaches. In this regard, the research highlights the considerable potential of a mobility system that succeeds in integrating contextual and cultural sensitivities, and the formidable baseline for agency this represents, well beyond the mobility domain (Bergman, Bergman, & Thatcher 2019). Beyond opening up a space for a more comprehensive approach to study individual mobility practices, the research also calls into question the universal solutions implicit in many formulations of sustainable mobility. Whether it is a future-oriented, Brundtland-based approach (Richardson 2005), or one based on reduction and de-growth as proposed by Banister (2008), or Bradshaw's (1992) green transportation hierarchy, these definitions of sustainable mobility are often difficult to reconcile with the lived experiences of many citizens around the world. Based on the findings from the research presented here, a more inclusive definition of sustainable mobility has been outlined.

In sum, psychology has at its disposal extensive knowledge about individuals and their practices, and is therefore ideally positioned to make a tremendous contribution to the field of sustainable mobility. Using mobility as agency to examine the interdependencies and conditionalities of mobility practices, it is hoped that this research illustrates what this contribution could be.

Limitations of the research

It is important to view the above contributions in light of the limitations of the research. Of these, the most significant is perhaps the small scale of the studies. Given the small sample size and the non-random selection of participants, these findings cannot be generalised beyond the specific study contexts. From the beginning, this project was designed to identify specific theoretical constructs on agency and environment in different contexts and cultures. Thus, generalisability was neither possible nor desirable. Specifically, the aim was to describe a typology of practices or expectations as proposed by the literature, and how this typology translates into the lives of the study participants in three different cultures. Despite the non-generalisability of the research, transposing general policy assumptions into specific study contexts can be useful to illustrate the limitations of mobility systems and policies. The theoretical framework used in these studies, and the empirical findings associated with the mobility as agency framework goes some way to illustrate this (Bergman, Bergman, & Thatcher 2019).

In terms of the limitations introduced by biases, specifically in qualitative research, it is worth mentioning some elements that can threaten the quality of data collection, data analysis, and the reporting of research results. Some biases can and should be addressed during the research process, as mentioned in this thesis. To address bias in data collection, for example, the interviewer avoided asking leading questions during interviews. In terms of avoiding bias, strategies included: piloting phases in each research site to ensure that the wording and phrasing was appropriate for the target group, the order of questions did not lead to an order effect, that people felt comfortable during the interview and had enough time to respond, and that there were no sensitive issues involved. In terms of analyses and to ensure that interpretations were not arbitrary, other analysts were explicitly involved during different stages of the analysis to discuss and settle divergent interpretations. Specifically, consensus building always included members and native language speakers from the target group from the three research sites (Mandarin/Chinese, US American, and Afrikaans and English/South African). This was further complemented by avoiding haphazard or selective reporting. This entailed that the analyses and interpretations of clusters and themes were always justified by clearly linking these to the empirical evidence: the interview data. The process of conducting a re-contextualization analysis discussed in the methods section is illustrative of this. In other words, interpretations were always grounded in the data by supporting the claims with evidence from the data.

Every data collection method and every data analysis method has inherent biases and two issues that were unavoidable in this research relate to the interviewer effect and bias introduced by the analyst. In interview-based research, the interviewer has an effect on the kind of data that is collected because of the specific characteristics they bring to the interview context, such as their age, gender, ethnicity, regional accent, personality traits,

amongst other factors (Bergman 2018). These biases can only ever be partially addressed. For instance, it is possible to vary characteristics of interviewers or analysts, such as age, ethnicity, gender, and so on. The problem with this is that the biases generated with each social group membership do not necessarily cancel each other out (Bergman 2018). The “average” of one white and one black interviewer does not yield objective interview data. The problem of interview bias can be understood as a method bias, which is inherent to all data collection and data analysis methods (Bergman 2018). Similarly to survey research or participant observations, every method has its method-specific bias, which cannot be eliminated through that method (Bergman 2018). Another quality concern pertains to the analysis itself. Another bias that is unavoidable concerns how the analyst introduces bias in terms of their academic socialization, their preference for a specific theory, how they were trained, the field-specific or national context in which they were trained, how they position themselves in relation to the research subject as well as the research participants (Bergman 2018). Someone who was trained as a Foucauldian discourse analyst will have a very different approach to somebody who was trained in a Goffman interactionist school of thought. Combining these will not eliminate the bias, just as conducting an atheoretical analysis will, instead of eliminating these biases, create another set of idiosyncratic biases (Bergman 2018). Accordingly, the analysts must make sense of the raw data, and this process is in itself biased, due in part to their training, supervision, preferred approach and theory. Thus, some biases can be addressed, such as the avoidance of leading questions and selective reporting, while others are part of every research project, such as the selection of subject area, theory, and data collection and data analysis methods. Cognizant of the role of the researcher in terms of reflexivity, it is explicitly acknowledged that the researcher is intimately involved in both the process and the production of the research (Horsburgh 2003). However, all levels of analysis always

remain data-driven and interpretations grounded in the data by supporting the claims with evidence from the data.

Research is always conditional and partial. Conditional, because under different conditions of data collection (e.g. group vs. individual interviews) and analysis (MDS vs social network analysis), the results would have diverged. However, the strategies outlined above not only help to satisfy the established quality criteria within the field of research, but they furthermore facilitate the process of engaging with the research in a way that others can follow the logic of the research and see the systematicity in the data collection, data analysis, and presentation of results (Bergman 2018). Thus, research results are only replicable in that the replicator follows the logic and argumentation of theory selection, operationalisation, and analytic strategy.

Finally, we could also consider the voluntary participation of interviewees as a potential source of bias. On the one hand, this is based on the idea that if it were possible to interview people who would refuse to participate, the interviews would have yielded systematically different data. Beyond the ethical issue of pursuing such an approach – we cannot make people participate who do not wish to participate, the implicit assumption is that if we do not access people who do not wish to participate, then we are not able to get at their perspectives. However, this critique implies the need for representativity because it suggests that we would get different data if we were able to interview different “types” of people. As mentioned earlier, this research cannot claim representativity but merely assesses the applicability of the key concepts of agency and environment as proposed by Bandura. From this perspective, 30 other people may have provided very similar results in that the three agency types and three environments may have been present in their

responses. On the other hand, while the literature vacillates between whether or not interviewees should be compensated for their time, there exists the potential that reimbursing research participants for their time could introduce a ‘pleasing effect’ or compliance, whereby participants may aim to provide information to the researcher they perceive as helpful (Bergman 2018). As there is no convincing evidence that compensation leads to higher data quality in one-to-one interviews, and that there are grounds to suspect that compensation changes the character of an interview from a social activity to a paid activity (which may complicate opting out of data collection, among others), interviewees were not reimbursed.

Another limitation concerns the focus on research sites within the countries, instead of a focus on the countries themselves. While some of the subtle characteristics that are consistent with the dominant traits of the respective cultures of these research sites as well as some of the particular cultural dynamics making up mobility practices were identified, findings cannot be extrapolated to make claims about national cultures or national contexts. This would also not be a viable approach as it is not possible to make national-level claims about culture especially given how complex each country is, and the extensive variations that exist within each country.

While all research is partial and conditional, regardless of the theoretical approach and extent of data used, the research is also bounded by a particular time and zeitgeist. Significant political changes or environmental disasters, for example, could introduce dynamics that would render findings historical at best. In a similar vein, the research has limited usefulness to policy since it is tied to specific historical, contextual, and cultural dynamics, which are not stable or reproducible. Because the findings presented here are

based on a specific academic theory and within a narrow time and space constraint, it is not possible to give direct advice on what policy makers should or should not do. Nevertheless, findings could inspire researchers to increase the study sites and improve on the sampling strategies to generate findings that may shape mobility policies in the future.

Finally, while Bandura's concept of personal agency and his Model of Triadic Reciprocal Causation provide a useful and interesting framework to study mobility as agency, there are many other theoretical frameworks, which could have been used to study individual mobility practices. Given that the degree of convergence between different theories tends to be weak, using a different theory would potentially have led to an entirely different study and respective findings. In this way, the a priori choice of using a specific theoretical framework presents both strengths and weaknesses (as would approaches that develop frameworks based on empirical evidence, of course).

Future research

To overcome the limitations imposed by the small scale of the studies, future large-scale research could examine the psychosocial and socio-structural dimensions of individual mobility practices in more detail. Such studies would also be better positioned to advise policy makers.

By using Bandura's concept of personal agency and his Model of Triadic Reciprocal Causation to study mobility as agency, the research could identify various agentive pathways, which explore how mobility as agency is inherently psychosocial and functionally dependent on technical and socio-structural environmental dimensions. This provides a strong foundation to argue for a more nuanced understanding of agency as distinct and systematic patterns of reciprocal interactions, which transcend unidirectional concepts of agency. Future research could examine the reciprocal interactions of agency beyond the mobility domain to study how agentive pathways function more generally. This could facilitate more innovative approaches in areas of research where SCT is already well-established, such as in the field of health, especially therapeutic research (Bandura 1997; Langlois et al. 1999), preventative health (Tougas et al. 2015), public health education (Ryerson 1994; Rogers et al. 1999; Bandura 2004a; Chapman-Novakofski & Karduck 2005), education (Bores-Rangel et al. 1990; Church et al. 1992; Hackett & Byars 1996), and media studies (Gibson 2004; Hill et al. 2009). Specifically, such studies could explore how other modes of agency, such as proxy or collective agency facilitate or constrain the potential of preventative health education interventions or how different environmental determinants facilitate or constrain these. Significantly, such an approach would also be able to better conceptualise how these types of agency and environments interrelate to form complex social encounters. This type of knowledge, once integrated into intervention designs, could help to improve the effectiveness of these types of interventions.

This framework, furthermore, explicitly integrates context and culture into individual practices and the variability embedded in the model provides a useful framework to study the changing constellation of contextual and cultural influences. This is something future

research should pursue further by extending the research to other mobility domains or country contexts. Extending mobility as agency to study individual mobility practices in India is currently underway. Modelled on the mobility as agency studies presented in this thesis, the India study uses the same overarching research questions outlined in this thesis.

Given the importance of sustainability more generally as well as the rapid changes the world is currently undergoing, it is vital for disciplines such as psychology to be able to effectively conceptualise and integrate the relationship between people and their environment. Developing solutions that will help individuals adapt to a rapidly changing world is contingent on accounting for these interactions. Future studies that are able to do so will be well positioned to make a significant contribution. For example, by examining the complex and multidimensional interdependence between the individual, social, and environmental dimensions of people's mobility practices and systematising the intra- and inter-personal, psychosocial, and socio-structural environmental dimensions associated with mobility practices and the various ways they interrelate to form distinct agentic pathways, the studies presented in this thesis are illustrative of one way this could be achieved.

Finally, as in all empirical studies, researchers have to make hard choices on what to include and what to exclude. Gender dynamics, ethnic group or class memberships, educational backgrounds, and many other social or regional groupings would have produced divergent sets of findings, as would an economic, sociological, historical, cultural, or critical approach to the research focus. I am fully aware of this shortcoming of the current research and opportunities for future research – as all empirical researchers (and theorists) should be.

Conclusion

This research used Bandura's concept of agency and his Model of Triadic Reciprocal Causation to link the mobility preferences and behaviours of individuals to the particular mobility context and environment within which these daily mobility encounters are situated. The resulting conceptual framework on mobility as agency illustrates the complex and multidimensional interdependence between the individual, social, and environmental dimensions of people's mobility practices by systematising the intra- and inter-personal, psychosocial, and socio-structural environmental dimensions associated with mobility practices and the various ways they interrelate to form distinct agentic pathways. The empirical application of mobility as agency in different research sites enabled us to observe not only the reciprocal interdependence of mobility practices but also how they vary in relation to culture and context. The aim of developing a framework on mobility of agency was to explore how a sophisticated psychological theory could contribute to a better understanding of individual agency within specific mobility environments in order to improve conceptualisations and implementations of sustainable mobility solutions (Bergman, Bergman, & Thatcher 2019). Accordingly, this research could make a small contribution to advancing psychological research on the dynamic reciprocal relationship between individuals, culture, and environment and, in doing so, suggest a culture-sensitive and context-relevant approach to studying and consulting on sustainable mobility.

The hope is that this research will inspire other studies in cultural psychology on sustainability and on mobility, and that different disciplines could recognise the

importance of cultural psychological contributions to sustainability and mobility. Moving beyond the confines of our conventional practices will require thinking of and finding ways to explicitly integrate context and culture into our studies on individuals and groups, and this research should serve as a small illustration thereof. In the field of sustainable mobility specifically, we should not allow engineers and technological development to dominate the debate about sustainable mobility specifically and sustainability more generally because, ultimately it will be individuals in their roles as consumers, commuters, citizens, and policy makers that will determine our future through how we behave. Whether we will achieve any kind of sustainability goal is mainly a function of individuals and groups in context, and the extent of global survival and prosperity is very much dependent on what lower- and middle-income countries will practice – in contrast to most Eurocentric theoretical models. With its theoretical and empirical toolbox, psychology has a fundamental role to play in addressing the gap between ideology-driven sustainability theory and lived, everyday practices.

REFERENCES

- Aglietta, M., & Guo, B. (2016). *CEPII - China's 13th Five-Year Plan. In Pursuit of a "Moderately Prosperous Society"* (CEPII Policy Brief No. 2016–12).
<http://www.cepii.fr/CEPII/en/publications/pb/plaintext.asp?NoDoc=9474>
- Anderson, B.R.O. (2006). *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (Revised edition). Verso.
- APA. (2017). *Ethical Principles of Psychologists and Code of Conduct*.
<https://www.apa.org/ethics/code/index>
- APA. (2020). *Psychology: Science in Action*. <https://www.apa.org/action/about/>
- Arnal, E., & Förster, M. (2010). Chapter 1: Growth, Employment and Inequality in Brazil, China, India and South Africa: An Overview. In OECD (Ed.), *Tackling Inequalities in Brazil, China, India and South Africa: The Role of Labour Market and Social Policies* (pp. 13–55). OECD Publishing.
<http://www.oecd.org/employment/emp/45282661.pdf>
- Arnott, B., Rehackova, L., Errington, L., Sniehotta, F.F., Roberts, J., & Araujo-Soares, V. (2014). Efficacy of Behavioural Interventions for Transport Behaviour Change: Systematic Review, Meta-Analysis and Intervention Coding. *The International Journal of Behavioral Nutrition and Physical Activity*, 11, 133.
<https://doi.org/10.1186/s12966-014-0133-9>
- Babbie, E.R. (2012). *The Practice of Social Research*. Cengage Learning.
- Bærenholdt, J.O. (2013). Governmobility: The Powers of Mobility. *Mobilities*, 8(1), 20–34. <https://doi.org/10.1080/17450101.2012.747754>

- Bailo, C., Dziczek, K., Smith, B., Spulber, A., Chen, Y., & Schultz, M. (2018). *The Great Divide: What Consumers Are Buying vs. The Investments Automakers & Suppliers Are Making in Future Technologies, Products & Business Models*. Center for Automotive Research. <http://www.cargroup.org/wp-content/uploads/2018/02/The-Great-Divide-What-Consumers-Are-Buying-vs-The-Investments-Automake....pdf>
- Ban, K. (2016, July 19). *Welcome Address*. 38th meeting, High-level Segment - High-level Political Forum on Sustainable Development 2016, New York, NY. <http://webtv.un.org/topics-issues/>
- Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Prentice-Hall, Inc.
- Bandura, A. (1989). Human Agency in Social Cognitive Theory. *The American Psychologist*, 44(9), 1175–1184. <https://doi.org/10.1037/0003-066X.44.9.1175>
- Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. Worth Publishers.
- Bandura, A. (2000a). Exercise of Human Agency Through Collective Efficacy. *Current Directions in Psychological Science*, 9(3), 75–78. <https://journals.sagepub.com/doi/10.1111/1467-8721.00064>
- Bandura, A. (2000b). *Self-efficacy: The Foundation of Agency*. In *Control of human behavior, mental processes, and consciousness: Essays in honor of the 60th birthday of August Flammer* (pp. 17–33). Lawrence Erlbaum Associates Publishers.
- Bandura, A. (2001). Social Cognitive Theory: An Agentic Perspective. *Annual Review of Psychology*, 52(1), 1–26. <https://doi.org/10.1146/annurev.psych.52.1.1>
- Bandura, A. (2002). Social Cognitive Theory in Cultural Context. *Applied Psychology*, 51(2), 269–290. <https://doi.org/10.1111/1464-0597.00092>

- Bandura, A. (2004a). Health Promotion by Social Cognitive Means. *Health Education & Behavior*, 31(2), 143–164. <https://doi.org/10.1177/1090198104263660>
- Bandura, A. (2004b). Social Cognitive Theory for Personal and Social Change by Enabling Media. In A. Singhal, M.J. Cody, E.M. Rogers, & M. Sabido (Eds.), *Entertainment-Education and Social Change: History, Research, and Practice* (pp. 75–96). Lawrence Erlbaum Associates Publishers.
- Bandura, A. (2006). Toward a Psychology of Human Agency. *Perspectives on Psychological Science*, 1(2), 164–180. <https://doi.org/10.1111/j.1745-6916.2006.00011.x>
- Bandura, A. (2008). An Agentic Perspective on Positive Psychology. In S.H. Lopez (Ed.), *Positive Psychology: Exploring the Best in People, Vol 1: Discovering Human Strengths* (pp. 167–196). Praeger Publishers/Greenwood Publishing Group.
- Bandura, A. (2018). Toward a Psychology of Human Agency: Pathways and Reflections. *Perspectives on Psychological Science*, 13(2), 130–136. <https://doi.org/10.1177/1745691617699280>
- Banister, D. (2008). The Sustainable Mobility Paradigm. *Transport Policy*, 15(2), 73–80. <https://doi.org/10.1016/j.tranpol.2007.10.005>
- Banister, D. (2011). Cities, Mobility and Climate Change. *Journal of Transport Geography*, 19(6), 1538–1546. <https://doi.org/10.1016/j.jtrangeo.2011.03.009>
- Banister, D., Pucher, J., & Lee-Gosselin, M. (2007). Making Sustainable Transport Politically and Publically Acceptable: Lessons from the EU, USA, and Canada. In P. Rietveld & R. Stough (Eds.), *Institutions and Sustainable Transport: Regulatory Reform in Advanced Economies* (pp. 17–50). Edward Elgar Publishing.

- Bartlett, L., & Vavrus, F. (2017). Comparative Case Studies: An Innovative Approach. *Nordic Journal of Comparative and International Education (NJCIE)*, 1(1).
<https://doi.org/10.7577/njie.1929>
- Batteau, A. (2015, June 8). *imagineTrains USA: Project Overview* [Mobile Lives Forum imagineTrains USA workshop].
- Batteau, A., Gamst, F., Zielinski, S., Anand, K., & Roti, M. (2015, June 8).
imagineTrains USA: Imagining the Future of Railways in California [Mobile Lives Forum imagineTrains USA workshop].
- Batteau, A., Zielinski, S., Anand, K., Roti, M., & Treutl, I. (2015, June 8).
imagineTrains USA: Imagining the Future of Rail in the Midwest [Mobile Lives Forum imagineTrains USA workshop].
- Bell, D.A. (2008). *China's New Confucianism: Politics and Everyday Life in a Changing Society*. Princeton University Press.
- Berger, L. (forthcoming). *thectar: Tools for Hermeneutic Content Analysis in R* (Version R Package version 0.0.0.9000) [R].
- Berger, L. (2016, Fall Semester). *Multi-dimensional Scaling* [Course].
- Bergman, M.M., Berger, L., Leisinger, K.M., Bergman, Z., Liu, B., & Zhang, J. (2017).
Corporate Responsibility Expectations in China: Advanced Business and Economics Students from Beijing. In L. Berger & M.M Bergman (Eds.), *Sustainable Business, Management, and Economics* (pp. 17–39). MDPI.
- Bergman, M.M., Eberle, T.S., Förster, T., Horber, E., Maeder, C., Mottier, V., Nadia, E., Rolshoven, J., Seale, C., & Widmer, J. (2010). *Qualitative Research Methods: A Statement on the Meaning, Quality Assessment, and Teaching of Qualitative Research Methods*. SAGW. <https://www.alexandria.unisg.ch/69504/>

- Bergman, M.M. (1998). *Acculturation, Identity, and Intergroup Relations of Mexican Americans and European Americans*. Cambridge: Unpublished PhD thesis.
- Bergman, M.M. (2010). Hermeneutic Content Analysis: Textual and Audiovisual Analyses within a Mixed Methods Framework. In A. Tashakkori & C. Teddlie, *SAGE Handbook of Mixed Methods in Social & Behavioral Research* (pp. 379–396). SAGE Publications.
- Bergman, M.M. (2011). Content Configuration Analysis. *StudyCube, University of St. Gall*.
- Bergman, M.M. (2018, August 20). *Qualitative Interviewing*. Social Science Methods 22nd Swiss Summer School 2018, Università della Svizzera Italiana, Lugano.
- Bergman, M.M., Berger, L., Leisinger, K., Zhang, J., Liu, B., & Bergman, Z. (2015). How Well do Chinese Corporate Responsibility Expectations Map onto an International Corporate Responsibility Scale? *UmweltWirtschaftsForum*, 23(4), 191–196. <https://doi.org/10.1007/s00550-015-0373-4>
- Bergman, M.M., & Bergman, Z. (2011). Perspectives of Learners and Teachers on School Dysfunctions in South Africa. *Education as Change*, 15(1), 35–48. <https://doi.org/10.1080/16823206.2011.643620>
- Bergman, M.M., & Bergman, Z. (2014). *imagineTrains Singapore: Project Report*. Mobile Lives Forum, SNCF.
- Bergman, M.M., & Bergman, Z. (2015). The Imaginary of the Train of the Future in South Africa: From Public Access to Social Exclusion. *World Transport Policy and Practice*, 21(3), 23–34. [ISSN 1352-7614](https://doi.org/10.1080/13527614.2015.1061111)
- Bergman, M.M., Bergman, Z., & Gravett, S. (2011). The Development and Application of the Explanatory Model of School Dysfunctions. *South African Journal of Education*, 31(4), 461–474. <https://doi.org/10.15700/saje.v31n4a476>

- Bergman, Z. (2019). Trains in the Land of the Car: A Case Study of Mobility as Agency in the United States. *Sustainability*, 11(23), 6710.
<https://doi.org/info:doi/10.3390/su11236710>
- Bergman, Z., & Bergman, M.M. (2019). A Case Study of the Sustainable Mobility Problem–Solution Paradox: Motility and Access of Metrorail Commuters in the Western Cape. *Sustainability*, 11(10), 2842. <https://doi.org/10.3390/su11102842>
- Bergman, Z., Bergman, M.M., Baocheng L., & Zhang, J. (2015). The Roots of Corporate Philanthropy in China. *Journal of International Business Ethics*, 8(1), 3–27. <https://doi.org/10.1007/s10551-015-2757-3>
- Bergman, Z., Bergman, M.M., Fernandes, K., Grossrieder, D., & Schneider, L. (2018). The Contribution of UNESCO Chairs toward Achieving the UN Sustainable Development Goals. *Sustainability*, 10(12), 4471.
<https://doi.org/10.3390/su10124471>
- Bergman, Z., Bergman, M.M., Haenggi, C., Zhao, L., & Thatcher, A. (2020). Technological Change and Sociocultural Models in China: A Case Study of Train Users Living in Beijing. *Mobilities*, 15(4), 465–479.
<https://doi/10.1080/17450101.2020.1748997>
- Bergman, Z., Bergman, M.M., & Pirie, G. (2014). Die Zukunft der Bahnmobilität in Südafrika: Vom Service Public zur sozialen Exklusion. *Afrika Bulletin*, 156, 6–7.
http://www.afrikakomitee.ch/Bulletin/AfrikaBulletin156_2014.pdf.
- Bergman, Z., Bergman, M.M., & Thatcher, A. (2019). Agency and Bandura’s Model of Triadic Reciprocal Causation: An Exploratory Mobility Study among Metrorail Commuters in the Western Cape, South Africa. *Frontiers in Psychology*, 10.
<https://doi.org/10.3389/fpsyg.2019.00411>

- Bin, W., Chu-Hong, Z., Qiong-Yu, H., & Zhen-Peng, L. (2010). Empirical Research on the Factor of ERP's User Customer Satisfaction Based on Triadic Reciprocal Determinism. *2010 International Conference on Management Science Engineering 17th Annual Conference Proceedings*, Melbourne, VIC, 2010, pp. 58–66.
<https://doi.org/10.1109/ICMSE.2010.5719785>
- Black, W.R. (2010). *Sustainable Transportation: Problems and Solutions* (First edition). The Guilford Press.
- Boas, I. (2017). Environmental Change and Human Mobility in the Digital Age. *Geoforum*, 85, 153–156. <https://doi.org/10.1016/j.geoforum.2017.07.022>
- Bockover, M.I. (2010). Confucianism and Ethics in the Western Philosophical Tradition I: Foundational Concepts. *Philosophy Compass*, 5(4), 307–316.
<https://doi.org/10.1111/j.1747-9991.2010.00295.x>
- Bores-Rangel, E., Church, A.T., Szendre, D., & Reeves, C. (1990). Self-efficacy in Relation to Occupational Consideration and Academic Performance in High School Equivalency Students. *Journal of Counseling Psychology*, 37(4), 407–418.
<https://doi.org/10.1037/0022-0167.37.4.407>
- Borg, I., Groenen, P.J.F., & Mair, P. (2012). *Applied Multidimensional Scaling*. Springer-Verlag. <https://doi.org/10.1007/978-3-642-31848-1>
- Bradshaw, C. (1992). *The Green Transportation Hierarchy*. Ottawalk and the Transportation Working Committee of the Ottawa-Carleton Round-table on the Environment. <https://hearthhealth.wordpress.com/about/previously-published-works/feet-first-early/the-green-transportation-hierarchy-a-guide-for-personal-public-decision-making/>

- Bräutigam, D., & Tang, X. (2014). “Going Global in Groups”: Structural Transformation and China’s Special Economic Zones Overseas. *World Development*, 63, 78–91. <https://doi.org/10.1016/j.worlddev.2013.10.010>
- Brög, W., Erl, E., & Mense, N. (2004). Individualised Marketing: Changing Travel Behaviour for a Better Environment. In *Communicating Environmentally Sustainable Transport: The Role of Soft Measures* (pp. 83–97). OECD Publishing.
- Bryant, A., & Charmaz, K. (Eds.). (2011). *The SAGE Handbook of Grounded Theory* (Paperback edition reprinted). SAGE Publications.
- Carillo, K.D. (2010). Social Cognitive Theory in IS Research – Literature Review, Criticism, and Research Agenda. In S.K. Prasad, H.M. Vin, S. Sahni, M.P. Jaiswal, & B. Thipakorn (Eds.), *Information Systems, Technology and Management* (pp. 20–31). Springer.
- Cass, N., & Faulconbridge, J. (2016). Commuting Practices: New Insights into Modal Shift from Theories of Social Practice. *Transport Policy*, 45, 1–14. <https://doi.org/10.1016/j.tranpol.2015.08.002>
- Cass, N., Shove, E., & Urry, J. (2005). Social Exclusion, Mobility and Access. *The Sociological Review*, 53(3), 539–555. <https://doi.org/10.1111/j.1467-954X.2005.00565.x>
- Cellina, F., Bucher, D., Mangili, F., Simão, J.V., Rudel, R., & Raubal, M. (2019). A Large Scale, App-Based Behaviour Change Experiment Persuading Sustainable Mobility Patterns: Methods, Results and Lessons Learnt. *Sustainability*, 11(9), 2674. <https://doi.org/10.3929/ethz-b-000348873>
- Chapman-Novakofski, K., & Karduck, J. (2005). Improvement in Knowledge, Social Cognitive Theory Variables, and Movement Through Stages of Change After a

- Community-Based Diabetes Education Program. *Journal of the American Dietetic Association*, 105(10), 1613–1616. <https://doi.org/10.1016/j.jada.2005.07.010>
- Charalampous, K., & Kokkinos, C.M. (2014). Students' Big Three Personality Traits, Perceptions of Teacher Interpersonal Behavior, and Mathematics Achievement: An Application of the Model of Reciprocal Causation. *Communication Education*, 63(3), 235–258. <https://doi.org/10.1080/03634523.2014.917688>
- Charlton, C. (2004). Social Change and Sustainable Transport, William Black and Peter Nijkamp. Indiana University Press, Bloomington and Indianapolis (2003), ISBN 1 800 842 6796, 306pp, \$69.95 (hbk). *Journal of Transport Geography*, 12(2), 165–167. <https://doi.org/10.1016/j.jtrangeo.2004.02.003>
- Chatterjee, K., & Bonsall, P. (2009). Editorial for Special Issue on “Evaluation of Programmes Promoting Voluntary Change in Travel Behaviour.” *Transport Policy*, 16(6). <https://doi.org/10.1016/j.tranpol.2009.10.001>
- Chen, Z., Xue, J., Rose, A.Z., & Haynes, K.E. (2016). The Impact of High-Speed Rail Investment on Economic and Environmental Change in China: A Dynamic CGE Analysis. *Transportation Research Part A: Policy and Practice*, 92, 232–245. <https://doi.org/10.1016/j.tra.2016.08.006>
- Christensen, C.M., Raynor, M.E., & McDonald, R. (2015, December 1). What Is Disruptive Innovation? *Harvard Business Review*, December 2015. <https://hbr.org/2015/12/what-is-disruptive-innovation>
- Church, A.T., Teresa, J.S., Rosebrook, R., & Szendre, D. (1992). Self-Efficacy for Careers and Occupational Consideration in Minority High School Equivalency Students. *Journal of Counseling Psychology*, 39(4), 498–508. <https://doi.org/10.1037/0022-0167.39.4.498>

- Cohen, A.B. (2009). Many Forms of Culture. *American Psychologist*, 64(3), 194–204.
<https://doi.org/10.1037/a0015308>
- Cohen, D., Nisbett, R.E., Bowdle, B.F., & Schwarz, N. (1996). Insult, Aggression, and the Southern Culture of Honor: An “Experimental Ethnography.” *Journal of Personality and Social Psychology*, 70(5), 945–959. <https://doi.org/10.1037//0022-3514.70.5.945>
- Collado, S., Staats, H., & Corraliza, J.A. (2013). Experiencing Nature in Children’s Summer Camps: Affective, Cognitive and Behavioural Consequences. *Journal of Environmental Psychology*, 33, 37–44. <https://doi.org/10.1016/j.jenvp.2012.08.002>
- Collins, C.M., & Chambers, S.M. (2016). Psychological and Situational Influences on Commuter-Transport-Mode Choice: *Environment and Behavior*, 37(5), 640–661.
<https://doi.org/10.1177/0013916504265440>
- Collomb, J.-D. (2014). The Ideology of Climate Change Denial in the United States. *European Journal of American Studies*, 9(9–1). <https://doi.org/10.4000/ejas.10305>
- Cooper, M.D. (2000). Towards a Model of Safety Culture. *Safety Science*, 36(2), 111–136. [https://doi.org/10.1016/S0925-7535\(00\)00035-7](https://doi.org/10.1016/S0925-7535(00)00035-7)
- Coxon, A.P.M. (1982). *User’s Guide to Multidimensional Scaling: With Special Reference to the MDS (X) Library of Computer Programs* (First edition). Heinemann.
- Creswell, J.W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications.
- Creswell, J.W., & Plano Clark, V.L. (2018). *Designing and Conducting Mixed Methods Research* (Third Edition). SAGE Publications.

- 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. <https://doi.org/10.3390/su11164274>
- de Winter, J.C.F., Dodou, D., & Wieringa, P.A. (2009). Exploratory Factor Analysis With Small Sample Sizes. *Multivariate Behavioral Research*, 44(2), 147–181. <https://doi.org/10.1080/00273170902794206>
- Deloitte. (2019). *2019 Global Automotive Consumer Study Consumer trends in the automotive industry*. <https://www2.deloitte.com/us/en/pages/manufacturing/articles/automotive-trends-millennials-consumer-study.html>
- Denzin, N.K., & Lincoln, Y.S. (Eds.). (2003). *Strategies of Qualitative Inquiry* (Second edition). SAGE Publications.
- Diniz, I.M.S., Duarte, M. de F., Peres, K.G., de Oliveira, E.S.A., & Berndt, A. (2015). Active Commuting by Bicycle: Results of an Educational Intervention Study. *Journal of Physical Activity & Health*, 12(6), 801–807. <https://doi.org/10.1123/jpah.2013-0215>
- Dostoevsky, F. (1864). *Notes from Underground* (R. Pevear & L. Volokhonsky (Trans.); Reprint edition). Vintage.
- Doughty, K., & Murray, L. (2016). Discourses of Mobility: Institutions, Everyday Lives and Embodiment. *Mobilities*, 11(2), 303–322. <https://doi.org/10.1080/17450101.2014.941257>
- Dupont, V. (2004). Socio-Spatial Differentiation and Residential Segregation in Delhi: A Question of Scale? *Geoforum*, 35(2), 157–175. <https://doi.org/10.1016/j.geoforum.2003.08.003>

- Dyllick, T., & Hockerts, K. (2002). Beyond the Business Case for Corporate Sustainability. *Business Strategy and the Environment*, 11(2), 130–141.
<https://doi.org/10.1002/bse.323>
- Eastman, C., & Marzillier, J.S. (1984). Theoretical and Methodological Difficulties in Bandura's Self-Efficacy Theory. *Cognitive Therapy and Research*, 8(3), 213–229.
<https://doi.org/10.1007/BF01172994>
- Eaton, L., & Louw, J. (2000). Culture and Self in South Africa: Individualism-Collectivism Predictions. *The Journal of Social Psychology*, 140(2), 210–217.
<https://doi.org/10.1080/00224540009600461>
- Elkington, J. (1998). *Cannibals with Forks : Triple Bottom Line of 21st Century Business*. John Wiley & Son Ltd.
- Eom, K., & Kim, H. (2014). Cultural Psychological Theory. In B. Gawronski & G.V. Bodenhausen (Eds.), *Theory and Explanation in Social Psychology* (pp. 328–344). The Guilford Press.
- Ettema, D., Gärling, T., Olsson, L.E., Friman, M., & Moerdijk, S. (2013). The Road to Happiness: Measuring Dutch Car Drivers' Satisfaction with Travel. *Transport Policy*, 27, 171–178. <https://doi.org/10.1016/j.tranpol.2012.12.006>
- Faist, T. (2013). The Mobility Turn: A New Paradigm for the Social Sciences? *Ethnic and Racial Studies*, 36(11), 1637–1646.
<https://doi.org/10.1080/01419870.2013.812229>
- Faure, C. (2014). *L'architecture souterraine de la future métropole parisienne : réflexions sur l'imaginaire du train à partir d'une enquête sur la conception et la réalisation du réseau du Grand Paris Express*. Université Paris Diderot (ICT) Identités, Cultures et Territoires.

- Fewsmith, J. (2012). *China since Tiananmen: The Politics of Transition*. Cambridge University Press.
- Fiske, A.P., Kitayama, S., Markus, H.R., & Nisbett, R.E. (1998). The Cultural Matrix of Social Psychology. In D.T. Gilbert, S. Fiske, & G. Lindzey (Eds.), *The Handbook of Social Psychology* (pp. 915–981). McGraw-Hill.
- Friedmann, J. (1986). The World City Hypothesis. *Development and Change*, 17(1), 69–83. <https://doi.org/10.1111/j.1467-7660.1986.tb00231.x>
- Fukuyama, F. (2000). *The Great Disruption: Human Nature and the Reconstitution of Social Order* (First edition). Free Press.
- Funk, C., & Hefferon, M. (2019). U.S. Public Views on Climate and Energy. Pew Research Center. <https://www.pewresearch.org/science/2019/11/25/u-s-public-views-on-climate-and-energy/>
- Garvis, S., & Pendergast, D. (Eds.). (2016). *Asia-Pacific Perspectives on Teacher Self-Efficacy*. Sense Publishers.
- Geerken, T., Vercalsteren, A., & Borup, M. (2009). Review of the Mobility Domain. In T. Geerken & M. Borup (Eds.), *System Innovation for Sustainability 2: Case Studies in Sustainable Consumption and Production — Mobility* (pp. 6–26). Greenleaf Publishing Limited.
- Geertz, C. (1973). *The Interpretation Of Cultures* (First edition). Basic Books.
- Gehlert, T., Dziekan, K., & Gärling, T. (2013). Psychology of Sustainable Travel Behavior. *Transportation Research Part A: Policy and Practice*, 48, 19–24. <https://doi.org/10.1016/j.tra.2012.10.001>
- Geurs, K.T., & van Wee, B. (2004). Accessibility Evaluation of Land-Use and Transport Strategies: Review and Research Directions. *Journal of Transport Geography*, 12(2), 127–140. <https://doi.org/10.1016/j.jtrangeo.2003.10.005>

- Gibson, S.K. (2004). Social Learning (Cognitive) Theory and Implications for Human Resource Development: *Advances in Developing Human Resources*, 6(2), 193–210. <https://doi.org/10.1177/1523422304263429>
- Glaser, B.G. (1992). *Basics of Grounded Theory Analysis: Emergence vs. Forcing*. Sociology Press.
- Graham-Rowe, E., Skippon, S., Gardner, B., & Abraham, C. (2011). Can We Reduce Car Use and, If So, How? A Review of Available Evidence. *Transportation Research Part A: Policy and Practice*, 45(5), 401–418. <https://doi.org/10.1016/j.tra.2011.02.001>
- Greene, D.L. (2001). Sustainable Transportation. In P. Baltes & N. Smelser (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* (pp. 15335–15339). Elsevier.
- Grengs, J. (2001). Does Public Transit Counteract the Segregation of Carless Households? Measuring Spatial Patterns of Accessibility. *Transportation Research Record*, 1753(1), 3–10. <https://doi.org/10.3141/1753-01>
- Grieco, M., & Urry, J. (2016). *Mobilities: New Perspectives on Transport and Society*. Ashgate.
- Gries, P.H. (2005). *China's New Nationalism* (First edition). University of California Press.
- Guadagno, L. (2016). Human Mobility in the Sendai Framework for Disaster Risk Reduction. *International Journal of Disaster Risk Science*, 7(1), 30–40. <https://doi.org/10.1007/s13753-016-0077-6>
- Guba, E.G., & Lincoln, Y.S. (1994). Competing Paradigms in Qualitative Research. In N.K Denzin & Y.S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 105–117). SAGE Publications.

- Hackett, G., & Byars, A.M. (1996). Social Cognitive Theory and the Career Development of African American Women. *The Career Development Quarterly*, 44(4), 322–340. <https://doi.org/10.1002/j.2161-0045.1996.tb00449.x>
- Hammond, M., & Wellington, J.J. (2013). *Research Methods: The Key Concepts*. Routledge.
- Hannam, K., Sheller, M., & Urry, J. (2006). Editorial: Mobilities, Immobilities and Moorings. *Mobilities*, 1(1), 1–22. <https://doi.org/10.1080/17450100500489189>
- Hansen, W.G. (1959). How Accessibility Shapes Land Use. *Journal of the American Institute of Planners*, 25(2), 73–76. <https://doi.org/10.1080/01944365908978307>
- He, G., Mol, A.P.J., Zhang, L., & Lu, Y. (2015). Environmental Risks of High-Speed Railway in China: Public Participation, Perception and Trust. *Environmental Development*, 14, 37–52. <https://doi.org/10.1016/j.envdev.2015.02.002>
- Hegel, G.W.F. (1820). *Hegel: Elements of the Philosophy of Right*. Cambridge University Press.
- Heine, S.J., Lehman, D.R., Ide, E., Leung, C., Kitayama, S., Takata, T., & Matsumoto, H. (2001). Divergent Consequences of Success and Failure in Japan and North America: An Investigation of Self-Improving Motivations and Malleable Selves. *Journal of Personality and Social Psychology*, 81(4), 599–615. <https://doi.org/10.1037/0022-3514.81.4.599>
- Herring, H., & Roy, R. (2007). Technological Innovation, Energy Efficient Design and the Rebound Effect. *Technovation*, 27(4), 194–203. <https://doi.org/10.1016/j.technovation.2006.11.004>
- Hill, J.R., Song, L., & West, R.E. (2009). Social Learning Theory and Web-Based Learning Environments: A Review of Research and Discussion of Implications.

American Journal of Distance Education, 23(2), 88–103.

<https://doi.org/10.1080/08923640902857713>

Hipp, J.R. (2016). Collective Efficacy: How is it Conceptualized, How is it Measured, and Does it Really Matter for Understanding Perceived Neighborhood Crime and Disorder? *Journal of Criminal Justice*, 46, 32–44.

<https://doi.org/10.1016/j.jcrimjus.2016.02.016>

Hofstede, G.H. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. SAGE Publications.

Holden, E. (2004). Ecological Footprints and Sustainable Urban Form. *Journal of Housing and the Built Environment*, 19(1), 91–109.

<https://doi.org/10.1023/B:JOHO.0000017708.98013.cb>

Holden, E., & Gilpin, G. (2013). Biofuels and Sustainable Transport: A Conceptual Discussion. *Sustainability*, 5(7), 3129–3149. <https://doi.org/10.3390/su5073129>

Holden, E., & Høyer, K.G. (2005). The Ecological Footprints of Fuels. *Transportation Research Part D: Transport and Environment*, 10(5), 395–403.

<https://doi.org/10.1016/j.trd.2005.04.013>

Holden, E., Linnerud, K., & Banister, D. (2013). Sustainable Passenger Transport: Back to Brundtland. *Transportation Research Part A: Policy and Practice*, 54, 67–77.

<https://doi.org/10.1016/j.tra.2013.07.012>

Holden, E., Linnerud, K., & Banister, D. (2017). The Imperatives of Sustainable Development. *Sustainable Development*, 25(3), 213–226.

<https://doi.org/10.1002/sd.1647>

Holton, M. (2019). Walking with Technology: Understanding Mobility-Technology Assemblages. *Mobilities*, 14(4), 435–451.

<https://doi.org/10.1080/17450101.2019.1580866>

- Horsburgh, D. (2003). Evaluation of Qualitative Research. *Journal of Clinical Nursing*, 12(2), 307–312. <https://doi.org/10.1046/j.1365-2702.2003.00683.x>
- Hoy, W.K., & Di Paola, M. (2007). *Essential Ideas for the Reform of American Schools*. IAP.
- Hunecke, M., Haustein, S., Grischkat, S., & Böhler, S. (2007). Psychological, Sociodemographic, and Infrastructural Factors as Determinants of Ecological Impact Caused by Mobility Behavior. *Journal of Environmental Psychology*, 27(4), 277–292. <https://doi.org/10.1016/j.jenvp.2007.08.001>
- Hutchison, E.D. (2008). *Dimensions of Human Behavior: The Changing Life Course*. SAGE Publications.
- Imada, T. (2010). Cultural Narratives of Individualism and Collectivism: A Content Analysis of Textbook Stories in the United States and Japan. *Journal of Cross-Cultural Psychology*, 43(4), 576–591. <https://doi.org/10.1177/0022022110383312>
- IPCC. (2007). *The IPCC Fourth Assessment Report on Climate Change. Synthesis Report*. Intergovernmental Panel on Climate Change (IPCC).
- Jakobsson, C. (2007). Instrumental Motives for Private Car Use. In T. Gärling & L. Steg (Eds.), *Threats from Car Traffic to the Quality of Urban Life* (pp. 205–217). Elsevier.
- Jensen, O.B. (2009). Flows of Meaning, Cultures of Movements – Urban Mobility as Meaningful Everyday Life Practice. *Mobilities*, 4(1), 139–158. <https://doi.org/10.1080/17450100802658002>
- Johnson, D.W., & Johnson, R.T. (2015). Cooperation and Competition. In J.D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (Second edition) (pp. 856–861). Elsevier. <https://doi.org/10.1016/B978-0-08-097086-8.24051-8>

- Kaufmann, V., Bergman, M.M., & Joye, D. (2004). Motility: Mobility as Capital. *International Journal of Urban and Regional Research*, 28(4), 745–756.
<https://doi.org/10.1111/j.0309-1317.2004.00549.x>
- Kennedy, S., & Parker, D.A. (2015). *Building China's "One Belt, One Road."* Center for Strategic and International Studies. <https://www.csis.org/analysis/building-china%E2%80%99s-%E2%80%9Cone-belt-one-road%E2%80%9D>
- Kerr, D. (2015). Introduction: China's Many Dreams. In D. Kerr (Ed.), *China's Many Dreams: Comparative Perspectives on China's Search for National Rejuvenation* (pp. 1–9). Palgrave Macmillan UK. https://doi.org/10.1057/9781137478979_1
- Kim, H., & Markus, H.R. (1999). Deviance or Uniqueness, Harmony or Conformity? A Cultural Analysis. *Journal of Personality and Social Psychology*, 77(4), 785–800.
<https://doi.org/10.1037/0022-3514.77.4.785>
- Kim, H.S. (2002). We Talk, Therefore We Think? A Cultural Analysis of the Effect of Talking on Thinking. *Journal of Personality and Social Psychology*, 83(4), 828–842. <https://doi.org/10.1037/0022-3514.83.4.828>
- Kitayama, S., Markus, H.R., Matsumoto, H., & Norasakkunkit, V. (1997). Individual and Collective Processes in the Construction of the Self: Self-Enhancement in the United States and Self-Criticism in Japan. *Journal of Personality and Social Psychology*, 72(6), 1245–1267. <https://doi.org/10.1037//0022-3514.72.6.1245>
- Kitayama, S., Mesquita, B., & Karasawa, M. (2006). Cultural Affordances and Emotional Experience: Socially Engaging and Disengaging Emotions in Japan and the United States. *Journal of Personality and Social Psychology*, 91(5), 890–903.
<https://doi.org/10.1037/0022-3514.91.5.890>
- Koh, N. (2019, January 21). 3 Billion Trips in 40 days: China's Lunar New Year Migration Begins. *South China Morning Post*.

<https://www.scmp.com/news/china/society/article/2183049/3-billion-trips-40-days-china-begins-lunar-new-year-mass>

Kraus, M.W., Piff, P.K., & Keltner, D. (2011). Social Class as Culture: The Convergence of Resources and Rank in the Social Realm. *Current Directions in Psychological Science*, 20(4), 246–250.

<https://doi.org/10.1177/0963721411414654>

Landry, N., Gifford, R., Milfont, T.L., Weeks, A., & Arnocky, S. (2018). Learned Helplessness Moderates the Relationship Between Environmental Concern and Behavior. *Journal of Environmental Psychology*, 55, 18–22.

<https://doi.org/10.1016/j.jenvp.2017.12.003>

Langlois, M.A., Petosa, R., & Hallam, J.S. (1999). Why Do Effective Smoking Prevention Programs Work? Student Changes in Social Cognitive Theory Constructs. *The Journal of School Health*, 69(8), 326–331.

<https://doi.org/10.1111/j.1746-1561.1999.tb06423.x>

Levesque, R.J.R. (2011). *Encyclopedia of Adolescence*. Springer Science & Business Media.

Lokhorst, A.M., Werner, C., Staats, H., van Dijk, E., & Gale, J.L. (2013). Commitment and Behavior Change: A Meta-Analysis and Critical Review of Commitment-Making Strategies in Environmental Research. *Environment and Behavior*, 45(1),

3–34. <https://doi.org/10.1177/0013916511411477>

Loo, B.P.Y. (2002). Role of Stated Preference Methods in Planning for Sustainable Urban Transportation: State of Practice and Future Prospects. *Journal of Urban Planning and Development*, 128(4), 210–224.

[https://doi.org/10.1061/\(ASCE\)0733-9488\(2002\)128:4\(210\)](https://doi.org/10.1061/(ASCE)0733-9488(2002)128:4(210))

- Low, K.C.P. (2011). “*Confucius, the Value of Benevolence and What’s in it for Humanity?*” (SSRN Scholarly Paper ID 1960366). Social Science Research Network. <https://papers.ssrn.com/abstract=1960366>
- Mair, P., de Leuw, J., Borg, I., & Groenen, P.J.F. (2015). *Multidimensional Scaling in R: SMACOF* (Version R Package version 1.9–6) [R].
- Masuda, T., Gonzalez, R., Kwan, L., & Nisbett, R.E. (2008). Culture and Aesthetic Preference: Comparing the Attention to Context of East Asians and Americans. *Personality & Social Psychology Bulletin*, 34(9), 1260–1275. <https://doi.org/10.1177/0146167208320555>
- McGrath, R.G. (2013, November 25). The Pace of Technology Adoption is Speeding Up. *Harvard Business Review*. <https://hbr.org/2013/11/the-pace-of-technology-adoption-is-speeding-up>
- Mcgregor, M. (2017). *Labour Law Rules!* (Third edition). Siber Ink.
- Michailova, S., & Hutchings, K. (2006). National Cultural Influences on Knowledge Sharing: A Comparison of China and Russia. *Journal of Management Studies*, 43(3), 383–405. <https://doi.org/10.1111/j.1467-6486.2006.00595.x>
- Mokhtarian, P., & Salomon, I. (2001). *How Derived is the Demand for Travel? Some Conceptual and Measurement Considerations*. Institute of Transportation Studies, UC Davis. <https://ideas.repec.org/p/cdl/itsdav/qt1z26n1r8.html>
- Morling, B., Kitayama, S., & Miyamoto, Y. (2002). Cultural Practices Emphasize Influence in the United States and Adjustment in Japan. *Personality and Social Psychology Bulletin*, 28(3), 311–323. <https://doi.org/10.1177/0146167202286003>
- Morling, B., & Lamoreaux, M. (2008). Measuring Culture Outside the Head: A Meta-Analysis of Individualism-Collectivism in Cultural Products. *Personality and*

- Social Psychology Review*, 12(3), 199–221.
<https://doi.org/10.1177/1088868308318260>
- National Bureau of Statistics of China (NBS). (2019). *Length of Transportation Routes*.
<http://www.stats.gov.cn/tjsj/ndsj/2018/indexeh.htm>
- Nisbett, R.E. (1993). Violence and U.S. Regional Culture. *The American Psychologist*, 48(4), 441–449. <https://doi.org/10.1037//0003-066x.48.4.441>
- Novaco, R.W. (2001). Psychology of Transportation. In D.A. Hennessy (Ed.) *International Encyclopedia of Social & Behavioral Sciences* (pp. 15878–15882). Elsevier.
- OECD. (2013). *Recent Trends in Car Usage in Advanced Economies – Slower Growth Ahead?* (Discussion Paper 2013, 09, pp. 1–24). International Transport Forum.
<https://www.itf-oecd.org/sites/default/files/docs/dp201309.pdf>
- OECD. (2015). *All on Board: Making Inclusive Growth Happen*. OECD Publishing.
- OECD. (2016). *Making Cities Work for All: Data and Actions for Inclusive Growth*. OECD Publishing. <https://doi.org/10.1787/9789264263260-en>
- Olsson, L.E., Huck, J., & Friman, M. (2018). Intention for Car Use Reduction: Applying a Stage-Based Model. *International Journal of Environmental Research and Public Health*, 15(2), 216–230. <https://doi.org/10.3390/ijerph15020216>
- Olsson, L.E., Maier, R., & Friman, M. (2019). Why Do They Ride with Others? Meta-Analysis of Factors Influencing Travelers to Carpool. *Sustainability*, 11(8), 1–16.
<https://doi.org/10.3390/su11082414>
- People’s Republic of China. (2016). *The 13th Five-Year Plan for Economic and Social Development of the People’s Republic of China (2016-2020)*.
<http://en.ndrc.gov.cn/policyrelease/201612/P020161207645766966662.pdf>

- Petri, H.L., & Govern, J.M. (2012). *Motivation: Theory, Research, and Application*. Cengage Learning.
- Pillemer, K., Wells, N.M., Meador, R.H., Schultz, L., Henderson, C.R., & Cope, M.T. (2017). Engaging Older Adults in Environmental Volunteerism: The Retirees in Service to the Environment Program. *The Gerontologist*, 57(2), 367–375.
<https://doi.org/10.1093/geront/gnv693>
- Pirie, G.H. (2013). Sustainable Urban Mobility in ‘Anglophone’ Sub-Saharan Africa. In *Planning and Design for Sustainable Urban Mobility: Global Report on Human Settlements 2013* (pp. 1–44). UN-HABITAT.
- Pirie, G.H. (2009). Virtuous Mobility: Moralising vs Measuring Geographical Mobility in Africa. *Afrika Focus*, 22(1), 21–35. <https://doi.org/10.21825/af.v22i1.5042>
- Poortinga, W., Steg, L., & Vlek, C. (2016). Values, Environmental Concern, and Environmental Behavior: A Study into Household Energy Use. *Environment and Behavior*, 36(1), 70–93. <https://doi.org/10.1177/0013916503251466>
- Power, A. (2012). Social Inequality, Disadvantaged Neighbourhoods and Transport Deprivation: An Assessment of the Historical Influence of Housing Policies. *Journal of Transport Geography*, 21, 39–48.
<https://doi.org/10.1016/j.jtrangeo.2012.01.016>
- Proost, S., & Dender, K.V. (2008). Optimal Urban Transport Pricing in the Presence of Congestion, Economies of Density and Costly Public Funds. *Transportation Research Part A: Policy and Practice*, 42(9), 1220–1230.
<https://doi.org/10.1016/j.tra.2008.03.009>
- Resnick, D. (2015). The Political Economy of Africa’s Emergent Middle Class: Retrospect and Prospects. *Journal of International Development*, 27(5), 573–587.
<https://doi.org/10.1002/jid.3110>

- Revill, G. (2012). *Railway*. Reaktion Books.
- Richardson, B.C. (2005). Sustainable Transport: Analysis Frameworks. *Journal of Transport Geography*, 13(1), 29–39. <https://doi.org/10.1016/j.jtrangeo.2004.11.005>
- Rockström, J., & Sukhdev, P. (2016). A New Way of Viewing the Sustainable Development Goals [Stockholm Resilience Centre, Stockholm University]. *How Food Connects All the SDGs*.
<https://www.stockholmresilience.org/research/research-news/2016-06-14-how-food-connects-all-the-sdgs.html>
- Rogers, E.M., Vaughan, P.W., Swalehe, R.M.A., Rao, N., Svenkerud, P., & Sood, S. (1999). Effects of an Entertainment-Education Radio Soap Opera on Family Planning Behavior in Tanzania. *Studies in Family Planning*, 30(3), 193–211.
<https://doi.org/10.1111/j.1728-4465.1999.00193.x>
- Rorty, R. (1998). *Truth and Progress: Philosophical Papers*. Cambridge University Press.
- Rose, G. (2008). Encouraging Sustainable Campus Travel: Self-Reported Impacts of a University TravelSmart Initiative. *Journal of Public Transportation*, 11(1), 85–108. <https://doi.org/10.5038/2375-0901.11.1.5>
- Roy, A. (2016). *The Cost of Living*. Modern Library.
- Ryerson, W.N. (1994). Population Communications International: Its Role in Family Planning Soap Operas. *Population and Environment*, 15(4), 255–264.
<https://doi.org/10.1007/BF02208459>
- Sachs, J. (2006). *The End of Poverty: Economic Possibilities for Our Time* (Reprint edition). Penguin Books.

- Santillo, D. (2007). Reclaiming the Definition of Sustainability. *Environmental Science and Pollution Research - International*, 14(1), 60–66.
<https://doi.org/10.1065/espr2007.01.375>
- Sasaki, J.Y., Kim, H.S., & Xu, J. (2011). Religion and Well-being: The Moderating Role of Culture and the Oxytocin Receptor (OXTR) Gene. *Journal of Cross-Cultural Psychology*, 42(8), 1394–1405.
<https://doi.org/10.1177/0022022111412526>
- Schiavo, M.L., Prinari, B., Saito, I., Shoji, K., & Benight, C.C. (2019). A Dynamical Systems Approach to Triadic Reciprocal Determinism of Social Cognitive Theory. *Mathematics and Computers in Simulation (MATCOM)*, 159(C), 18–38.
<https://doi.org/10.1016/j.matcom.2018.10.006>
- Schipper, L. (2002). Sustainable Urban Transport in the 21st Century: A New Agenda. *Transportation Research Record: Journal of the Transportation Research Board*, 1792(1), 12–19. <https://doi.org/10.3141/1792-02>
- Schivelbusch, W. (1979). *The Railway Journey: Trains and Travel in the 19th Century*. Urizen Books.
- Schmutzler, J., Andonova, V., & Diaz-Serrano, L. (2018). How Context Shapes Entrepreneurial Self-Efficacy as a Driver of Entrepreneurial Intentions: A Multilevel Approach: *Entrepreneurship Theory and Practice*, 43(5), 880–920.
<https://doi.org/10.1177/1042258717753142>
- Sheller, M. (2011). Mobility. In *Sociopedia.isa*. SAGE Publications.
<http://www.sagepub.net/isa/resources/pdf/Mobility.pdf>
- Sheller, M., & Urry, J. (2006). The New Mobilities Paradigm. *Environment and Planning A: Economy and Space*, 38(2), 207–226. <https://doi.org/10.1068/a37268>

- Sheller, M., & Urry, J. (2016). Mobilizing the New Mobilities Paradigm. *Applied Mobilities*, 1(1), 10–25. <https://doi.org/10.1080/23800127.2016.1151216>
- Shepherd, A., & Marshall, E. (2005). Timeliness and Task Specification in Designing for Human Factors in Railway Operations. *Applied Ergonomics*, 36(6), 719–727. <https://doi.org/10.1016/j.apergo.2005.05.005>
- Shweder, R. (1995). Cultural Psychology: What is It? In N. Goldberger & J. Veroff (Eds.), *The Culture and Psychology Reader* (pp. 41–86). New York University Press.
- Skarin, F., Olsson, L.E., Friman, M., & Wästlund, E. (2019). Importance of Motives, Self-Efficacy, Social Support and Satisfaction with Travel for Behavior Change During Travel Intervention Programs. *Transportation Research Part F: Traffic Psychology and Behaviour*, 62, 451–458. <https://doi.org/10.1016/j.trf.2019.02.002>
- Snow, D.A., & Corrigall-Brown, C. (2015). Collective Identity. In J.D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* (Second edition) (pp. 174–180). Elsevier. <https://doi.org/10.1016/B978-0-08-097086-8.10403-9>
- Snibbe, A.C., & Markus, H.R. (2005). You Can't Always Get What You Want: Educational Attainment, Agency, and Choice. *Journal of Personality and Social Psychology*, 88(4), 703–720. <https://doi.org/10.1037/0022-3514.88.4.703>
- Spence, I. (1979). A Simple Approximation for Random Rankings Stress Values. *Multivariate Behavioral Research*, 14(3), 355–365. https://doi.org/10.1207/s15327906mbr1403_5
- Stanton, N.A., McIlroy, R.C., Harvey, C., Blainey, S., Hickford, A., Preston, J.M., & Ryan, B. (2013). Following the Cognitive Work Analysis Train of Thought: Exploring the Constraints of Modal Shift to Rail Transport. *Ergonomics*, 56(3), 522–540. <https://doi.org/10.1080/00140139.2012.718366>

- Starkey, P., & Hine, J.L. (2014). *Poverty and Sustainable Transport. How Transport Affects Poor People with Policy Implications for Poverty Reduction: A Literature Review*. UN-HABITAT.
- StatsSA. (2018). *Quarterly Employment Statistics (QES), Second Quarter 2018*.
StatsSA. <http://www.statssa.gov.za/publications/P0211/P02112ndQuarter2018.pdf>
- Steele, L.G., & Lynch, S.M. (2013). The Pursuit of Happiness in China: Individualism, Collectivism, and Subjective Well-Being during China's Economic and Social Transformation. *Social Indicators Research*, 114(2), 441–451.
<https://doi.org/10.1007/s11205-012-0154-1>
- Steg, L. (2005). Car Use: Lust and Must. Instrumental, Symbolic and Affective Motives for Car Use. *Transportation Research Part A: Policy and Practice*, 39(2), 147–162. <https://doi.org/10.1016/j.tra.2004.07.001>
- Steg, L., Bolderdijk, J.W., Keizer, K., & Perlaviciute, G. (2014). An Integrated Framework for Encouraging Pro-environmental Behaviour: The Role of Values, Situational Factors and Goals. *Journal of Environmental Psychology*, 38, 104–115.
<https://doi.org/10.1016/j.jenvp.2014.01.002>
- Steg, L., & Gifford, R. (2005). Sustainable Transportation and Quality of Life. *Journal of Transport Geography*, 13(1), 59–69.
<https://doi.org/10.1016/j.jtrangeo.2004.11.003>
- Steg, L., & Tertoolen, G. (1999). Sustainable Transport Policy: The Contribution from Behavioural Scientists. *Public Money & Management*, 19(1), 63–69.
<https://doi.org/10.1111/1467-9302.00154>
- Steg, L., & Vlek, C. (2009). Encouraging Pro-Environmental Behaviour: An Integrative Review and Research Agenda. *Journal of Environmental Psychology*, 29(3), 309–317. <https://doi.org/10.1016/j.jenvp.2008.10.004>

- Stephens, N.M., Markus, H.R., & Townsend, S.S.M. (2007). Choice as an Act of Meaning: The Case of Social Class. *Journal of Personality and Social Psychology*, 93(5), 814–830. <https://doi.org/10.1037/0022-3514.93.5.814>
- St-Jean, E., Radu-Lefebvre, M., & Mathieu, C. (2018). Can Less be More? Mentoring Functions, Learning Goal Orientation, and Novice Entrepreneurs' Self-Efficacy. *International Journal of Entrepreneurial Behavior & Research*, 24(1), pp. 2–21. <https://doi.org/10.1108/IJEBr-09-2016-0299>
- Stradling, S.G., Meadows, M.L., & Beatty, S. (2000). Helping Drivers Out of Their Cars: Integrating Transport Policy and Social Psychology for Sustainable Change. *Transport Policy*, 7(3), 207–215. [https://doi.org/10.1016/S0967-070X\(00\)00026-3](https://doi.org/10.1016/S0967-070X(00)00026-3)
- Sung, K. (2000). Respect for Elders: Myths and Realities in East Asia. *Journal of Aging and Identity*, 5(4), 197–205. <https://doi.org/10.1023/A:1026445420276>
- Takaki, R.T. (2008). *A Different Mirror: A History of Multicultural America* (First edition). Back Bay Books/Little, Brown, and Co.
- Tan, S. (2015). Cosmopolitan Confucian Cultures: Suggestions for Future Research and Practice. *International Communication of Chinese Culture*, 2(3), 159–180. <https://doi.org/10.1007/s40636-015-0022-1>
- Tashakkori, A.M., & Teddlie, C.B. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches* (First edition). SAGE Publications.
- Tashakkori, A., & Teddlie, C. (Eds.). (2010). *Sage Handbook of Mixed Methods in Social & Behavioral Research* (Second edition). SAGE Publications.
- Thatcher, A. (2012). Affect in Designing for Sustainability in Human Factors and Ergonomics. *International Journal of Human Factors and Ergonomics*, 1(2), 127. <https://doi.org/10.1504/IJHFE.2012.048034>

- Thomas, W.I., & Znaniecki, F. (1918). *The Polish Peasant in Europe and America: A Classic Work in Immigration History*. University of Illinois Press.
- Tillema, T., van Wee, B., & Ettema, D. (2010). Road Pricing and Relocation Decisions of Dutch Households. *Urban Studies*, 47(14), 3013–3033.
<https://doi.org/10.1177/0042098009360225>
- Titheridge, H., Mackett, R.L., Christie, N., Oviedo Hernández, D., & Ye, R. (2014). *Transport and Poverty: A Review of the Evidence* [Report]. UCL Transport Institute, University College London. <https://www.ucl.ac.uk/transport-institute/research-and-publications/publications>
- Tougas, M.E., Hayden, J.A., McGrath, P.J., Huguet, A., & Rozario, S. (2015). A Systematic Review Exploring the Social Cognitive Theory of Self-Regulation as a Framework for Chronic Health Condition Interventions. *PLoS ONE*, 10(8), e0134977. <https://doi.org/10.1371/journal.pone.0134977>
- Tsai, J.L., Louie, J.Y., Chen, E.E., & Uchida, Y. (2007). Learning What Feelings to Desire: Socialization of Ideal Affect Through Children's Storybooks. *Personality & Social Psychology Bulletin*, 33(1), 17–30.
<https://doi.org/10.1177/0146167206292749>
- Tsai, J.L., Miao, F.F., & Seppala, E. (2007). Good Feelings in Christianity and Buddhism: Religious Differences in Ideal Affect. *Personality and Social Psychology Bulletin*, 33(3), 409–421. <https://doi.org/10.1177/0146167206296107>
- Tschannen-Moran, M., & Hoy, A.W. (2001). Teacher Efficacy: Capturing an Elusive Construct. *Teaching and Teacher Education*, 17(7), 783–805.
[https://doi.org/10.1016/S0742-051X\(01\)00036-1](https://doi.org/10.1016/S0742-051X(01)00036-1)

- Tu, W. (1996). Beyond the Enlightenment Mentality: A Confucian Perspective on Ethics, Migration, and Global Stewardship. *The International Migration Review*, 30(1), 58–75. <https://doi.org/10.2307/2547458>
- Tu, W. (1998). Confucius and Confucianism. In W.H. Slote & G.A. de Vos (Eds.), *Confucianism and the Family* (pp. 3–36). SUNY Press.
- Tyfield, D. (2014). Putting the Power in ‘Socio-Technical Regimes’ – E-Mobility Transition in China as Political Process. *Mobilities*, 9(4), 585–603. <https://doi.org/10.1080/17450101.2014.961262>
- UNESCO. (2015, August 3). *Sustainable Development*. UNESCO. <https://en.unesco.org/themes/education-sustainable-development/what-is-esd/sd>
- Union Internationale des Chemins de fer (UIC). (2019). *High-Speed Rail History in China*. <https://uic.org/passenger/highspeed/High-Speed-History>
- United Nations. (2016). *Transforming Our World: The 2030 Agenda for Sustainable Development* (A/RES/70/1). United Nations. <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
- Urry, J. (1999, January 9). *Automobility, Car Culture and Weightless Travel: A Discussion Paper*. 16. Department of Sociology, Lancaster University, UK.
- Urry, J. (2000). Mobile Sociology. *The British Journal of Sociology*, 51(1), 185–203. <https://doi.org/10.1111/j.1468-4446.2000.00185.x>
- Urry, J. (2002). *Mobility and Connections*. Forum Vie Mobiles. <http://ville-en-mouvement.pagesperso-orange.fr/telechargement/040602/mobility.pdf>
- Urry, J. (2004). The ‘System’ of Automobility. *Theory, Culture & Society*, 21(4–5), 25–39. <https://doi.org/10.1177/0263276404046059>

- Uskul, A.K., Cross, S.E., Sunbay, Z., Gercek-Swing, B., & Ataca, B. (2012). Honor Bound: The Cultural Construction of Honor in Turkey and the Northern United States. *Journal of Cross-Cultural Psychology*, 43(7), 1131–1151.
<https://doi.org/10.1177/0022022111422258>
- van Wee, B., Holwerda, H., & van Baren, R. (2002). Preferences for Modes, Residential Location and Travel Behaviour: The Relevance for Land-Use Impacts on Mobility. *European Journal of Transport and Infrastructure Research*, 2(4), 305–316.
<https://doi.org/10.18757/ejtir.2002.2.4.3729>
- Varnum, M.E.W., Na, J., Murata, A., & Kitayama, S. (2012). Social Class Differences in N400 Indicate Differences in Spontaneous Trait Inference. *Journal of Experimental Psychology. General*, 141(3), 518–526.
<https://doi.org/10.1037/a0026104>
- Wan, F., Williamson, P.J., & Yin, E. (2015). Antecedents and Implications of Disruptive Innovation: Evidence from China. *Technovation*, 39–40, 94–104.
<https://doi.org/10.1016/j.technovation.2014.05.012>
- Wang, H., Masuda, T., Ito, K., & Rashid, M. (2012). How Much Information? East Asian and North American Cultural Products and Information Search Performance. *Personality and Social Psychology Bulletin*, 38(12), 1539–1551.
<https://doi.org/10.1177/0146167212455828>
- Wang, Y.F., Li, K.P., Xu, X.M., & Zhang, Y.R. (2014). Transport Energy Consumption and Saving in China. *Renewable and Sustainable Energy Reviews*, 29, 641–655.
<https://doi.org/10.1016/j.rser.2013.08.104>
- WCED. (1987). *Our Common Future*. UN & Oxford University Press.
- Wei, X. (2013). The Characteristics of Confucian Ethics. In B. Carr (Ed.), *Morals and Society in Asian Philosophy* (pp. 145–155). Routledge.

- Weingast, B.R. (1995). The Economic Role of Political Institutions: Market-Preserving Federalism and Economic Development. *Journal of Law, Economics, & Organization*, 11(1), 1–31.
- Westman, J., Friman, M., & Olsson, L.E. (2017). What Drives Them to Drive?—Parents’ Reasons for Choosing the Car to Take Their Children to School. *Frontiers in Psychology*, 8. <https://doi.org/10.3389/fpsyg.2017.01970>
- Williams, S.L., & Cervone, D. (1998). Social Cognitive Theories of Personality. In D. F. Barone, M. Hersen, & V.B. Van Hasselt (Eds.), *Advanced Personality* (pp. 173–207). Springer US.
- World Bank. (1996). *Sustainable Transport: Priorities for Policy Reform* (No. 15098). The World Bank.
<http://documents.worldbank.org/curated/en/113831468764674772/Sustainable-transport-priorities-for-policy-reform>
- World Bank. (2016). *Measuring Rural Access: Using New Technologies* (No. 107996). The World Bank.
<http://documents.worldbank.org/curated/en/367391472117815229/Measuring-rural-access-using-new-technologies>
- World Data. (2020). *Average income around the world*.
<https://www.worlddata.info/average-income.php>
- Wu, Y.-F., Xu, H.-G., & Lew, A.A. (2015). Consumption-Led Mobilized Urbanism: Socio-Spatial Separation in the Second-Home City of Sanya. *Mobilities*, 10(1), 136–154. <https://doi.org/10.1080/17450101.2013.853952>
- Xinhua. (2019, February 2). *Xinhua Headlines: Moving China: The Spring Festival train journey now and then – Xinhua*, *English.news.cn*.
http://www.xinhuanet.com/english/2019-02/02/c_137795136.htm

- Yang, H., Dobruszkes, F., Wang, J., Dijst, M., & Witte, P. (2018). Comparing China's Urban Systems in High-Speed Railway and Airline Networks. *Journal of Transport Geography*, 68(C), 233–244.
- Yamamoto, L., Serraglio, D.A., & de Cavedon-Capdeville, F.S. (2018). Human Mobility in the Context of Climate Change and Disasters: A South American Approach. *International Journal of Climate Change Strategies and Management*, 10(1), 65–85. <https://doi.org/10.1108/IJCCSM-03-2017-0069>
- Zhang, Y.-X., Chao, Q.-C., Zheng, Q.-H., & Huang, L. (2017). The Withdrawal of the U.S. from the Paris Agreement and its Impact on Global Climate Change Governance. *Advances in Climate Change Research*, 8(4), 213–219. <https://doi.org/10.1016/j.accre.2017.08.005>
- Zhao, P., & Li, S. (2016). Restraining Transport Inequality in Growing Cities: Can Spatial Planning Play a Role? *International Journal of Sustainable Transportation*, 10(10), 947–959. <https://doi.org/10.1080/15568318.2016.1191693>
- Zhao, S. (1998). A State-Led Nationalism: The Patriotic Education Campaign in Post-Tiananmen China. *Communist and Post-Communist Studies*, 31(3), 287–302. [https://doi.org/10.1016/S0967-067X\(98\)00009-9](https://doi.org/10.1016/S0967-067X(98)00009-9)
- Zhao, S. (2005). China's Pragmatic Nationalism: Is it Manageable? *The Washington Quarterly*, 29(1), 131–144. <https://doi.org/10.1162/016366005774859670>
- Zheng, Y. (Ed.). (2013). *Contemporary China: A History since 1978* (First edition). Wiley-Blackwell.
- Zuboff, S. (1989). *In The Age of The Smart Machine: The Future of Work and Power* (Reprint edition). Basic Books.

Zuboff, S. (2015). *Big Other: Surveillance Capitalism and the Prospects of an Information Civilization* (SSRN Scholarly Paper ID 2594754). Social Science Research Network. <https://papers.ssrn.com/abstract=2594754>

APPENDICES

Appendix 1: Interview Schedules

1. Interview schedule in English

Thank you for agreeing to talk to me about trains. I am interested in your own opinions and experiences, no matter how many or few you have. Please tell me about them in as much detail as you remember. Please take your time with answering the questions.

IER: Here is the first question: Could you please tell me everything that comes to mind when you think about trains.

IER: What is your best memory about a train? Just think of one event and tell me about it with as much detail as possible...

IER: What is your worst memory about a train? Just think of one event and tell me about it with as much detail as possible...

IER: When, where, and how often do you take trains?

IER: When was the last time you used the train and why?

IER: Why are you not using trains more often?

IER: What kind of tips do you have for people who make decisions about trains? What should they do?

IER: In your opinion, what will happen to trains in the future?

2. Interview schedule in Mandarin

非常感谢您能跟我谈您对火车的看法，我很想了解您关于火车的一些想法和体验，无论您之前有过多少与火车有关的经历。别着急，请好好回想一下当时的场景，尽量告诉我您所能记得住的细节。

1. 您能告诉我，当您听到“火车”这个词时，您脑海中所浮现的事物都是什么？
2. 您对火车最美好的回忆是什么？请描述其中一件，尽可能多地描述一下细节。
3. 您对火车最糟糕的回忆是什么？请描述其中一件，尽可能多地描述一下细节。
4. 您都在什么时候坐火车？您在哪里坐火车？您多久乘坐一次火车？
5. 您最近一次坐火车是什么时候？为什么那一次要坐火车呢？
6. 您不选择乘坐火车时的原因是什么？
7. 对于那些火车的决策者们，你想给他们什么建议？您认为他们应该做些什么呢？
8. 在您看来，未来的火车应该是什么样的呢？

3. Interview schedule in Afrikaans

Dankie dat u toegestem het om met my oor treine te praat. Ek is geïntereesê in jou opinies en ondervindinge en dit maak nie saak hoe veel of min u het nie. Ek wil graag hê dat u met my in so veel detail as moontlik daaroor praat. Neem asseblief jou tyd om die vrae te beantwoord.

1. Hier is die eerste vraag: Vertel my asseblief van alles waaraan jy dink wanneer jy aan treine dink?
2. Wat is jou beste herhinnering met 'n trein? Dink aan een spesifieke gebeurtenis en vertel my daarvan in so veel detail as moontlik...
3. Wat is jou slegste herhinnering met 'n trein? Dink aan een spesifieke gebeurtenis en vertel my daarvan in so veel detail as moontlik...
4. Waar, wanneer en hoe gereeld neem u treine?
5. Wanneer was die laaste keer dat u 'n trein geneem het?
6. Hoekom gebruik u nie treine meer nie?
7. As jy vir die mense wat besluite maak oor treine enige wenke of advies kan gee, wat sal dit wees? Wat moet hulle doen?
8. Wat is jou opinie gaan met treine in die toekoms gebeur?

Appendix 2: Ethical Clearance Certificate



HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Bergman

CLEARANCE CERTIFICATE

PROTOCOL NUMBER: H16/06/03

PROJECT TITLE

Agency and sustainable mobility: A case study of commuter train users in South Africa

INVESTIGATOR(S)

Ms Z Bergman

SCHOOL/DEPARTMENT

Human & Community Development/

DATE CONSIDERED

24 June 2016

DECISION OF THE COMMITTEE

Approved unconditionally

EXPIRY DATE

17 July 2019

DATE

18 July 2016

CHAIRPERSON


(Professor J Knight)

cc: Supervisor : Professor A Thatcher

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Signature

Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

Appendix 3: Title pages from publications in order of appearance in the thesis



Article

A Case Study of the Sustainable Mobility Problem–Solution Paradox: Motility and Access of Metrorail Commuters in the Western Cape

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Received: 19 March 2019; Accepted: 15 May 2019; Published: 18 May 2019



Abstract: Public transport in general and passenger trains in particular are often advertised as solutions to mobility challenges due to their relatively low carbon footprint, high commuter load, high public safety, and contribution to reduced road congestion. But, how do these advantages apply to contexts characterized by inequality, poverty, and exclusion, and where train infrastructure is underdeveloped and poorly maintained? In this study, we examine the imaginaries and their associated transport predispositions of Metrorail users in the Western Cape province of South Africa. Based on 31 interviews conducted with Metrorail users, we explored how they conceptualize access to and use of mobility. The conceptual framework for this is provided by the *Motility* concept as developed by Kaufmann, Bergman, and Joye. Findings show that the context and culture defining the daily lives of Metrorail users reflect a reality, which is far removed from the way we theorize sustainable mobility. The limitations of spatial and social inequality, which create the mobility boundaries of *Motility* for these commuters, reveal a significant gap between their lives and the policies aimed to foster our sustainable mobility future. Despite this, the commuters of our study are highly mobile, and we end this article with an attempt to align these conflicting domains of dysfunctional contexts, mobility practices, and sustainability ideals.

Keywords: sustainable mobility; trains; mobility access; Metrorail; motility; Western Cape; South Africa; content configuration analysis

We must all learn ... to think differently. We need to learn how to transform our policies and strategies to address the challenges of sustainability. To reach the poor and vulnerable, we need targeted policies, active outreach, and integrated information to inform decision-making. We need to recognize and understand the multiple dimensions of poverty and vulnerability, and how they interconnect. And we need to break down silos ... between the economic, social, and environmental aspects of development.

Ban Ki-Moon, former UN Secretary General, 19 July 2016 [1]

Look, I think that the service Metrorail provides is really terrible. I started using the trains in 2006. It was sad back then and now it is even sadder. It gets worse every year. (J, 1) (Each interview was assigned a unique identifier, denoted by a letter, followed by the page number of the transcript from which the quote was taken.)

1. Introduction

Our mobility reflects the best and worst of human development. The displacement of goods, information, technology, and people has alleviated extreme poverty for billions of people and increased

Article

Trains in the Land of the Car: A Case Study of Mobility as Agency in the United States

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Abstract: Recent studies have shown that self-efficacy—the belief that individuals are able to execute behaviors that lead to desired outcomes—is a key factor for adopting more sustainable travel modes and practices. Also crucial are societal values and policies associated with sustainability, which guide individual mobility behaviors. Thus, sustainable travel research and policies are divided into hard and soft approaches. This study applies Albert Bandura’s concept of personal agency and his model of triadic reciprocal causation (TRC) to explore mobility as agency from the perspective of 32 car users from regions, which no longer have an adequate passenger rail infrastructure. The aim is to investigate the applicability of TRC theory in a US context, as well as a substantive study of how car users make sense of their mobility practices in relation to trains. Based on hermeneutic content analysis, a mixed-method analytic framework, findings reveal that Bandura’s agentic pathways associated with individual and proxy agency define the mobility practices of interviewees. By exploring the underlying structures of salient agentic pathways, this study traces the links between agency and (un)sustainable travel within a US American mobility culture.

Keywords: sustainable travel; Albert Bandura; agency; model of triadic reciprocal causation (TRC); mixed methods; hermeneutic content analysis (HCA); multidimensional scaling (MDS); car users; trains; USA

1. Introduction

I’ve heard so many times that the reason we don’t have them is because we’re so big. And yet, all the rest of the world has trains and they’re used all the time. (12: 14)

The main aim of sustainable travel is to reduce car use and to promote more sustainable modes of transportation [1–4]. Yet, mobility interventions are contingent on the ability and willingness of individuals to adopt new behaviors. Accordingly, individuals need to value sustainable travel and embrace relevant policies [5]. To achieve sustainable travel, research and policies tend to focus on hard and soft approaches. Hard approaches emphasize structural and regulatory interventions, such as developing or improving public transport, creating bicycle infrastructure, introducing road-pricing initiatives, or providing monetary incentives (see for example [6–9]). These strategies aim to nudge people toward more sustainable mobility practices, which in turn are aimed at reducing car use [10]. Soft approaches consist of cognitive-motivational interventions that target affect, beliefs, and attitudes to encourage adoption of sustainable behaviors [9,11–13]. Self-efficacy—the belief that individuals are able to execute behaviors that lead to desired outcomes—is a significant predictor of behavioral change [10]. In line with the soft approach, interventions often focus on reinforcing beliefs aligned with sustainable travel via group discussions, role-play, and information campaigns [14–16]. In recent years,



Technological change and sociocultural models in China: A case study of train commuters in Beijing

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ABSTRACT

China's mobility turn has created the world's largest public rail system, contributing extensively to citizens' economic, social, and spatial mobility. Concurrently, this technological transformation has introduced many opportunities for individuation, which could potentially challenge the social, collectivistic, and Confucian foundations of China's sociocultural and political ideology. While the notion that 'mobility produces culture' is readily accepted, research on train mobility in China is rare. In this study, we use Albert Bandura's Model of Triadic Reciprocal Causation to conceptualize mobility as agency. We employ Hermeneutic Content Analysis, a mixed methods framework, to study how this rapidly evolving mobility environment connects to the lives of 31 regular train users living in Beijing. Studying agency in China enables us to systematize the sociocultural models within which mobility practices are embedded and how they manifest. We find that our interviewees embed agentive practices in a cultural model that is intertwined with collectivistic aspirations of the country. Technological developments are thus integrated into existing sociocultural models and political expectations, contradicting existing debates on the fracturing impact of disruptive technologies.

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KEYWORDS

Train mobility; sociocultural models; Albert Bandura; agency; Triadic Reciprocal Causation; mixed methods; Hermeneutic Content Analysis (HCA); Content Configuration Analysis (CCA); multidimensional scaling (MDS); train users; Beijing; China

China has launched several large-scale science and technology transformations to catalyze socio-economic development. An essential component of this has been the modernization and expansion of its 150-year-old rail system. By now, China is home to the largest and one of the most advanced rail systems in the world. It reaches across more than 127,000 km (NBS 2019), and high-speed rail (HSR), first introduced in 2007, maintains speeds between 250 and 350 km/h on more than 31,000 km of dedicated tracks (UIC 2019). The public mobility system, judged as safe, efficient, smart, environmentally friendly, and expanding, has become an essential building block for socioeconomic development (PRC 2016; see also Aglietta and Guo 2016; Bräutigam and Tang 2014). Businesses and the public profit considerably from these developments as expanding access to relatively affordable mobility reduces travel times, improves market access, fosters geospatial and social networks, and enhances educational opportunities and economic productivity (Chen et al. 2016; He et al. 2015; Wang et al. 2014; Wu, Xu, and Lew 2015; Yang et al. 2018). The vast rail network furthermore forms a lifeline, connecting rural, peri-urban, and urban regions with employment, manufacturing, and trading sites, education hubs, health services, and service centers, while geographically scattered family members are connected to their home regions, local traditions and cultures, and friendship

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Agency and Bandura's Model of Triadic Reciprocal Causation: An Exploratory Mobility Study Among Metrorail Commuters in the Western Cape, South Africa

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Most studies on sustainable mobility focus on technological, socio-structural, or psychosocial influences while neglecting individual motivations and practices. In this study, we examine mobility motivations and practices as part of a complex interplay between psychosocial and socio-structural dimensions within the mobility infrastructure of Metrorail in the Western Cape. Drawing on Albert Bandura's theory of personal agency and the model of triadic reciprocal causation, we interviewed 38 commuters (mean age 33 years, SD 11, 50% women/men) and analyzed the data using hermeneutic content analysis and multidimensional scaling. Based on our analyses, we identified three pathways that describe the mobility practices of Metrorail users, each with its own purpose and function. We explore these pathways and their consequences for sustainable mobility in relation to daily commuter agency, motivations, and past experiences.

Keywords: sustainable mobility, Albert Bandura, agency, triadic reciprocal causation, mixed methods, hermeneutic content analysis, content configuration analysis, Metrorail

INTRODUCTION

Despite decades of innovations and interventions, the transport sector still accounts for approximately one-sixth of greenhouse gas (GHG) and CO₂ emissions (IPCC, 2007, 2014). Consequently, mitigating environmental, health, and social risks caused by mobility practices remain a crucial challenge (Bandura, 2008; Geerken et al., 2009; Guadagno, 2016; Boas, 2017; Yamamoto et al., 2018). More sustainable mobility practices would mean "to reduce the need to travel (less trips), to encourage modal shift, to reduce trip lengths and to encourage greater efficiency in the transport system" (Banister, 2008, p. 75). Such solutions tend to focus on either technical and socio-structural changes or psychosocial interventions.

Technical and socio-structural approaches aim to mitigate GHGs by increasing the efficiency of transport systems. Known as hard policy approaches, they seek to remodel transportation systems through technological and infrastructure development (Novaco, 2001; Brög et al., 2004; Hunecke et al., 2007; Gehlert et al., 2013). Current green technology solutions include mass public transit, high-speed rail, shared and autonomous mobility systems, and electric vehicles.

Appendix 4: Pictorial of Mobility in the Western Cape, Beijing, and States without developed passenger rail in the US

