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Sustainable mobility in Florianópolis:
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Abstract:

Abstract. Mobility in Brazil represents a crucial challenge for policy makers, given the economic, environmental and social problems that current patterns of transportation bear in densely populated urban areas. The research stems from the assumption that, since commuters play a key-role in driving the change towards innovative and environment-friendly mobility systems, a thorough understanding of the motives underpinning modal choice is a pre-requisite for the implementation of sound strategies and policies. The paper illustrates the preliminary results of an empirical investigation on modal choice on a sample of 436 commuters from the urban area of Florianópolis, Santa Catarina (Brazil). Policy implications for public authorities are presented, and avenues for future research are proposed.

Keywords: sustainable mobility; policy makers; commuters; travel mode choice.
JEL Classification Numbers: M48

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1. Introduction

This paper presents the preliminary findings of a research project on sustainable mobility in the State of Santa Catarina (Brazil), focusing on the determinants of modal choice as to provide policy makers and all interested actors an adequate informational background on which to build sound policies and strategies. After an introductory paragraph on the evolution and the current challenges of mobility, the paper focuses on the key role played by commuters in shaping new, sustainable mobility patterns in urban areas. The antecedents of commuters' behavior are illustrated in detail, providing an overview on the main theoretical frameworks investigating the psychological and behavioral correlates of modal choice. The following paragraph describes the setting of the empirical investigation, illustrating mobility challenges in Brazil with specific reference to the city of Florianópolis. The methods section illustrates in detail the setting up of the questionnaire adopted for the analysis, and the statistical techniques to be used. Then, preliminary findings are presented and policy implications discussed.

Recent years witnessed growing interest for the sustainability of transport and mobility, which "has become over time a major concern for policy makers and a conceptual challenge for scholars of different disciplines" (Lanzini & Stocchetti 2017). Concerns refer to the fact that transport is responsible for 14% of global GHG emissions and for over 15% of other polluting emissions, with the situation particularly severe in urban and densely populated areas. Traffic congestion, health related problems and environmental degradation represent challenges that policy makers have to deal with, as to curb the detrimental impacts of a sector that is bound to increase over the next decades. Current research on sustainable mobility is focusing on aspects that have been long overlooked, yet bear the potential to increase our understanding of the mechanisms underpinning mobility patterns, this being a pre-requisite for a sound management of future strategies and policies. Table 1 summarizes some emerging issues in urban mobility planning and management (Lanzini & Stocchetti 2017):

Table 1: Emerging issues in mobility research

From transport to mobility.	Mobility represents a broader concept, as it refers to the economic and social context of movement instead of actual movement, alone. As a consequence, the focus is shifting from infrastructures to integrated planning of land use and mobility.
From eco-centrism to socio-centrism.	An increased attention for the social dimension is integrating the original emphasis on environmental issues such as air pollution and land consumption. Social equity, accessibility and minimization of social exclusion are becoming key-elements to be considered when assessing the effectiveness of mobility systems, and planning future developments.
From speed paradigm to productivity paradigm.	The traditional speed paradigm (the faster the trip, the better) is being gradually replaced by so-called productivity paradigm, where travel time is assumed to have an inherent value. There is an emerging interest on how commuters perceive travel time, and what variables (habits, comfort, inter-modularity, etc.) affect such perception.
The relevance of the local context.	There is growing awareness on the need to shift from mobility strategies that are based on a one-size-fits-all model, to flexible tools capable of declining some overarching principles into the specificities of the local context. While the former act as broad guidelines, the latter adapt such principles to the distinctive features of the area object of analysis.
Growing concern for economic and financial issues related to mobility.	While so far the external costs of transport and the financial sustainability of urban mobility systems have been relegated to ancillary roles in mobility research, there is growing concern for the trade-off between socio-environmental improvements and the economic sustainability of transport. Research is bound to focus on methodologies to assess the external costs of transport, and the setting up of efficient business models for transport services.

(Source: Lanzini & Stocchetti 2017)

Such growing interest in mobility is mirrored by the fast pace at which most Countries are adopting innovative strategies aimed at increasing the sustainability of their mobility systems. The

European Union (EU) represents a front-runner in the shift to a new mobility paradigm, and can be regarded as a benchmark for Institutions willing to overcome the hindrances of current mobility patterns. Urban mobility is indeed a priority on the EU agenda, given the un-sustainability of current trends leading to heavy traffic congestion, severe air pollution and uncontrolled urban sprawl, in a continent where 75% of people live in cities. Whereas the specificities of each Member State and each urban area need to be considered as to set up the most efficient mobility strategy on a case-by-case approach, the EU is providing a homogeneous and integrated normative framework, spurring local authorities to adopt the long-term integrated policies that are needed in such a complex and turbulent environment (e.g., 2009 Action Plan on urban mobility [COM 2009], 2011 White Paper on transport [COM 2011] or the Urban Mobility Package [COM 2013]). A key instrument to achieve the objective of a competitive and sustainable urban transport system is represented by the development of so-called Sustainable Urban Mobility Plans (SUMPs). A SUMP represents "a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles" (COM 2013). It builds on the concept that plans for a functional mobility should be developed in a synergic cooperation between different sectors, policy areas and in strict cooperation with all stakeholders involved (citizens and commuters *in primis*), as to "improve accessibility of urban areas and providing high-quality and sustainable mobility and transport to, through and within the urban area" (COM 2013).

The relevance of regulation, standards and urban planning from the public sector should not overshadow, however, the key role that private actors play in shaping new paradigms of sustainable mobility. The industrial sector for instance (automotive industry and firms operating along the whole supply chain) is asked to introduce in the market either improved versions of existing products (e.g., traditional internal combustion engines vehicles with lower polluting emissions) or innovative products such as electric vehicles, hybrid vehicles, and so on. Even more so, citizens (hereinafter: commuters) *have the last word* by means of their daily behaviors, choosing between car use and public transportation, between private car ownership and car sharing, and so on. The centrality of commuters might appear trivial, yet it is often overlooked by the public debate on sustainable mobility, which is focused on the role of public institutions and the industrial sector, only. Indeed, behavioral changes at the individual level remain the key-element for any public policy to succeed: although different actors play relevant roles in shaping urban mobility paradigms, it is commuters that with their daily behaviors decree the success or failure of any commercial or policy initiative (Hunecke et al. 2010). As a consequence, since

policy makers need to gain deep understandings on the motives underpinning modal choice, it is crucial to shed light on the psychological and behavioral determinants of travel mode choice. Albeit a detailed description of theoretical models on travel mode choice exceeds the scope of the present paper, the next chapter provides an overview of the main frameworks that have been applied in commuter behavior research.

2. The role of citizens: travel mode determinants

When analyzing behaviors with relevant impacts on sustainability (as in the case of mobility, and specifically travel mode choice), two broad streams of theoretical frameworks emerge. On the one hand, theories that suggest behaviors are the outcome of a rational cognitive process, where individuals seek, collect and rationally evaluate available information to decide future course of action; on the other hand, theories suggesting that often behaviors are the result of an automatic response to familiar contexts and situations, so that habits emerge as the driving behavioral force. These two perspectives should be considered synergically and not as mutually exclusive, as both rational processes and habits play a role in shaping behavioral trajectories, with the relevance of either of the two changing according to the specificities of the behavior object of analysis, the individual and the context (Lanzini 2017).

With respect to the stream of research focusing on behavioral intentions as outcome of an aware cognitive process, the most popular and widely adopted framework (although born out of environmental research) is probably the Theory of Planned Behavior (TPB, Ajzen 1991). According to TPB, intentions are the closest antecedents of behavior and have, in turn, three main predictors: attitudes, subjective norms and perceived behavioral control. Attitudes "reflect the overall evaluation of the particular behaviour, and are based on expectancy beliefs about the likelihood that behaviour results in particular consequences, and of the desirability of those consequences" (Steg 2005, page 150); in other words, they represent the overall predisposition towards a behavior. Subjective norms represent what we believe close people and social groups would expect us to do in given situations, expressing perceived social pressure. Perceived behavioral control accounts for perceptions of how difficult it might be to adopt a specific behavior: indeed, not all behaviors are under volitional control, as the original formulation of the Theory of Reasoned Action (Fishbein & Ajzen 1975), from which TPB originates, predicted. TPB has been widely adopted in empirical investigations on travel mode, either in its original formulation or in later developments integrating further variables such as personal norms (Manstead & Parker 1995) and descriptive norms (Donald

et al. 2014, Heath & Gifford 2002), and even habits (Bamberg & Schmidt 2003, Donald et al. 2014, Verplanken et al. 1998).

Also moral (or personal) norms have been object of a vast literature on the determinants of travel mode choice. Such construct, which can be operationalized as "feelings of moral obligation to perform or refrain from specific actions" (Schwartz & Howard 1981, p. 191), represents the building block of the Norm-Activation-Theory or Model (NAM, Schwartz 1977), according to which personal norms get *activated* by the awareness of the adverse consequences of not adopting the virtuous behavior or the ascription of responsibility that we develop once we feel accountable for such negative outcome. Moreover, Value-Belief-Norm Theory (VBN, Stern 2000, Stern et al. 1999) integrates NAM and the New Ecological Paradigm (NEP, Dunlap & Van Liere 1978), which focuses on beliefs in the limit of growth and is a widely adopted measure of pro-environmental orientation, with the work of Schwartz on values: these can be described as "a desirable trans situational goal varying in importance, which serves as a guiding principle in the life of a person or other social entity" (Schwartz 1994, page 21). VBN suggests focusing on "a chain of variables, from general pro-environmental values and concern to specific beliefs on the consequences of certain activities, and the responsibility of individuals to avoid such detrimental consequences: sustainable personal norms for pro-environmental behavior should be activated, guiding individuals towards greener behavioral patterns" (Lanzini & Khan 2017, page 15).

Habits represent the building block of the second stream of research on mobility, which is a behavioral domain characterized by stable contexts and decisional settings that facilitate the emergence of automatic, goal oriented responses to familiar situations (Aarts & Dijksterhuis 2000, Verplanken et al. 1994). The Theory of Interpersonal Behaviour (Triandis 1977) assumes that when individuals perform an activity frequently and as a response to specific goals (e.g., urban commuting to work or shopping), habits act as the main predictor of behaviors, instead of intentions. Habits represent goal-oriented scripts that are based on repeated behaviors and carried out in stable contexts (Ouellette & Wood 1998, Verplanken & Aarts 1999), and they act as moderators of the intention-behavior relationship (Verplanken et al. 1998).

While an array of theories emerged on the topic, empirical investigations in literature reached inconsistent and heterogeneous results. This clearly represents a problem for policy makers interested in gaining insights of the psychological mechanisms underpinning modal choice: since *you cannot manage what you do not know*, it is of paramount importance to shed more light on which factors (and in which conditions) play a prominent role. To systematize the vast body of empirical evidence (coming from heterogeneous and at times distant literatures), a comprehensive meta-analysis was conducted to synthetize evidence on the psychological and behavioral

determinants of travel mode choice (Lanzini & Khan 2017). The results suggest that intentions are the main predictor of actual behaviors followed by habits, which are hence confirmed to play a key-role in shaping modal choice. Also the other TPB constructs emerge as relevant predictors, whereas environmental variables (e.g., environmental concern and values) play a relevant role in shaping behavioral intentions but not actual behaviors, signaling a deep intention-behavior gap. That is, regardless of their environmental beliefs and awareness many individuals fail to *walk the talk:* this has critical implications for policy makers aiming at modifying behavioral patterns of citizens, as policies targeting awareness of citizenship and the environmentalism of a community might fail to lead to an effective behavioral shift. The main results from the meta-analysis, with reference to the constructs to be adopted in the present study, are presented in table 2:

Table 2: Meta-analysis results

Correlates (car use)	Effect size f̂	Correlates (sustainable transport)	Effect size f̂
Attitudes	.406	Attitudes	.313
Social norms	.229	Social norms	.234
PBC	.270	PBC	.376
Habits	.410	Habits	.683

The high heterogeneity in the results, according to the moderator analysis performed, might be primarily attributable to the behaviors' operationalization and measurement; for instance, do empirical investigations frame questions on actual or typical behaviors (that is, measured with reference to a specific time frame or without such reference, respectively)? Other factors playing a role are represented by the type of trip, the sample and the period of the study, while the geographical location of the latter appears to be irrelevant.

3. Mobility challenges in Brazil

Nowadays, densely populated urban areas in Brazil face the detrimental impacts of mobility systems that prove to be inadequate to meet the social and environmental needs of citizens. The use of public transportation systems is shrinking in many urban contexts, gradually substituted by the use of private cars: the inadequacy of public transportation to support commuter needs bears the consequence of exacerbating the problem by triggering a vicious circle where the answer to mobility problems is found in private cars, whose role should be on the other hand minimized.

Initially, the concept of mobility "was predominantly seen as a matter of transportation services provision. Thus, the main problem faced by transportation planners was to match infrastructure supply with transportation demand" (Da Silva et al. 2008, page 350). Until recently, the focus on mobility-related policies was on traditional (that is, private) modes of transportation, with an emphasis on road transport and little interest in public transportation systems integrated synergically with the urban environment. In other words, the predominant approach was to consider urban mobility as a matter of provision of transport services. (Ministério das Cidades 2006). As a result, infrastructure investments prioritized road transport for individual mobility, with a total disregard for non-motorized modes and a complete separation between urban and transport planning, that resulted in uncoordinated actions encompassing environmental degradation, lack of social inclusion and sub-optimization of financial resources (Vasconcellos 2001). In the words of Da Silva et al. (2016), "The hallmarks of this planning strategy, building huge expressways, assigning high priority to individual vehicles instead of public transportation, and the lack of coordination between urban and transportation planning, lie at the root of the severe mobility problems found today in Brazilian cities" (page 79).

Growing awareness of the impacts of urban mobility mismanagement led to a shift in perspective in Brazil, with a new emerging concept of urban mobility. Stemming from the 1998 Federal Constitution that incorporated a chapter on urban policies and public transportation, the theme of the need to shift to sustainable mobility in urban areas started to be debated in Brazil. The Transport and Mobility Master Plan (PlanMob), which replaced in 2005 the Integrated Urban Transport Plan (Bergman & Rabi 2005) established regulations and tools for the organization and management of public transport and mobility in urban areas, supporting the idea that a new mobility concept needed to be incorporated in the broad and overarching municipal urban planning strategies. Albeit the PlanMob provides a sort of reference point for the implementation of urban mobility plans, the strong differences between local contexts in Brazil require a necessary flexibility as there is no *one size fits all* solution that can be optimal for all cities, regardless of the specificities of the case, and "the mobility plans have to assume distinct characteristics (and) have to adapt the concepts to the social context and the needs and potentials of each region" (Da Silva et al. 2008, page 352). The new mobility concept introduces social and environmental issues into the planning process, adding crucial dimensions to a complex process that, until the 1990s, was mainly based on traffic management and building of new infrastructures.

Our research analyzes the case of Florianópolis, a medium sized city of around 450,000 inhabitants, administrative capital of the State of Santa Catarina. The city shares most of the challenges affecting mobility in Brazilian urban areas; further, as will be later described, it has

some distinctive features that make the need to shift to a new, sustainable mobility paradigm more pressing. Florianópolis has a touristic vocation attracting large numbers of tourists on the holiday season, is home of two large universities and location of many enterprises active in the new technologies sector. Students and commuters coming to Florianópolis from the mainland put an increasing pressure on the transportation system, which also faces a complexity factor connected to the orographic structure and geographic location of the city, strongly limiting planning possibilities. Indeed, the city center is built on an island, connected to the mainland by two bridges for vehicles and pedestrians/bikers (Pedro Ivo bridge and Colombo Salles bridge). On the mainland, there are some peripheral neighborhoods of Florianópolis, which have been by now integrated in one single, densely populated conurbation totaling a population of over a million inhabitants, and that includes cities such as São José, Palhoça and Biguaçu. The hills on Florianópolis island put boundaries to residential buildings and transport infrastructures, widening the distances between different areas of the city and making some modal options (such as bike use) inconvenient for commuters. Public transport system is based on an integrated bus network, with a ticketing system that might penalize families with budget constraints, as it is not possible to purchase daily or weekly tickets or even tickets allowing unlimited rides over a specific time-frame (e.g., 90 minutes, or so), so that for instance citizens might avoid taking buses when go shopping, as this would entail paying the ticket twice. The city has no subway/metro railway systems, since large areas of the city are built on or around swampy grounds, so that building underground lines would be technically challenging and financially expensive. Moreover, the city has no ferries or boat services connecting the mainland (from where many commuters come) and the city center. There is an ongoing discussion on future plans for the setting up of boat services (for passengers only) connecting the city with São José and Palhoça, but these appear to be still far from the implementation stage.

Over the past decades, there has been a sharp decline in the use of public transportation, which is considered as inadequate by most commuters. This has been counterbalanced both by the development of innovative solutions for urban commute (e.g., car sharing systems, Uber, and so on) and by a steady rise in the circulating fleet of private vehicles: to date Florianópolis has around .48 cars per citizen, well above the national average of .32. According to the projections in Table 3, the trend is bound to continue in years to come:

Table 3: Car fleet in Florianópolis

Year	Population	Cars	Pop/car
1980	196.055	-	
1991	254.941	-	

2000	341.781	113.058	3,02
2010	421.240	189.008	2,23
2016	477.798	222.505	2,15
2017	478.637	234.256	2,04
2018	486.607	241.202	2,02
2019	494.578	248.147	1,99
2020	502.548	255.093	1,97

Source: population estimated from IBGE data; cars estimated from DETRANSC [2017-2020 estimate by Linear Regression]

Some suggest that, if no significant discontinuities with current trends are implemented, in 2019 the vehicular traffic on the bridges connecting the mainland with the city center might collapse, with severe consequences (both financial and not) for commuters and the city as a whole[1]. This evidence calls for an urgent change of pace in dealing with the issue of sustainable mobility in the Florianópolis area. The following chapters illustrate the methods and the results of an empirical investigation aimed at shedding light on the determinants of modal choice for a sample of Florianópolis commuters: such evidence should provide policy makers with an informational background on which to shape future policies.

4. Online survey and research questions

Whereas the final project is aimed at analyzing in detail the effects of the whole set of determinants both on modal choice intentions and on actual behaviors (with a thorough discussion in the event of a relevant intention-behavior gap), the present paper is based on preliminary analyses that can be used to fine-tune further steps of the research, and focuses on some key-antecedents of modal choice affecting the intentions of commuters to choose either private car use or alternative, sustainable transport modes. To this end, the selected variables refer to the two main theoretical frameworks adopted in mobility-related research: TPB and Habits.

The results section provides an overview of evidence emerging from data analysis, including broad descriptive statistics as well as inferential statistics to address the following research question:

RQ: What are the main antecedents of modal choice, with respect to both private mobility and alternative, sustainable mobility?

[1] http://dc.clicrbs.com.br/sc/colunistas/rafael-martini/noticia/2017/12/projeto-de-mobilidade-preve-colapso-na-ilha-caso-nada-seja-feito-ate-2019-10051110.html

Such an overarching research question can be split in multiple research questions, referring to specific behavioral antecedents of modal choice:

RQ1a: What is the role of the Planned Behavior constructs in affecting the intention of commuters to choose private mobility?

RQ1b: What is the role of habits in affecting the intention of commuters to choose private mobility?

RQ2a: What is the role of the Planned Behavior constructs in affecting the intention of commuters to choose sustainable mobility?

RQ2b: What is the role of habits in affecting the intention of commuters to choose sustainable mobility?

The study is based on a cross-sectional survey of residents in the Florianópolis area of Santa Catarina, Brazil. A questionnaire on urban mobility was structured and circulated using the Qualtrics software (while only part of the survey is used for the present paper, the Appendix reports the entire English questionnaire), whereas statistical analysis has been performed with IBM SPSS 23. Prospective participants were reached online with a recruiting message asking their willingness to participate in a study on mobility. 446 respondents opened the link to the online survey and filled in (at least partially) the questionnaire; of these replies, 10 could not be used in our calculations due to the high number of missing answers, so that the final sample consists of 436 residents (n=436; male 43%, mean age 27 years old). The questionnaire was first developed in English and then translated in Portuguese; it was pre-tested as to check the clarity of the questions and avoid misleading interpretations, and required about 15 minutes to be completed.

The questionnaire begins with introductory questions on the time spent and the kilometers travelled commuting on an average day. Then, the following section is dedicated to commuting behaviors and intentions, respectively. As regards the former, respondents are asked to state how often they used in the past 12 months a battery of transport modes[2], adopting a 5-point likert scale ranging from "never" to "very often". Similarly, intentions are investigated asking respondents how is their intention to use each transport modes for daily commutes in the coming weeks, on a 5-point likert scale ranging from "very weak" to "very strong". The third section of the questionnaire is devoted to the TPB constructs: attitudes, subjective norms and perceived behavioral control. Attitudes are investigated asking how pleasant would it be to use each transport mode in the future ("very unpleasant" to "very pleasant"). As regards subjective norms, respondents are asked whether their relevant ones would approve their use of each transport mode ("totally disagree" to "totally

[2] The transport modes considered in the questionnaire are private cars, car sharing, , bicycle motorbike, train, bus, subway, taxis, car pool and walking (both less than 2 km and over 2 km).

agree"). Thirdly, PBC is investigated asking respondents how difficult would it be for them to use each transport mode ("extremely difficult" to "extremely easy"). The following section is devoted to habits. The Self-Reported-Habit-Index[3] (Verplanken & Orbell 2003) is adopted: respondents are asked to state their agreement with 12 statements regarding both the use of private cars and alternative transport modes, as to investigate how such behaviors are habitual and automatic ("totally disagree" to "entirely agree"). Then, a battery of questions (some of which not pertinent to the present article) investigate aspects related to the relationship between commuters and mobility-related aspects, and specifically the awareness of consequences and the ascription of responsibility of air pollution as well as the role and prominence of environmental protection within the subjective value system. Broader behavioral patterns are investigated asking respondents how often ("never" to "always") they carry out a set of activities in the domain of recycling, green purchasing, curtailment behaviors and activism, which represent the main categories in most environmental behavior research (Thøgersen & Ölander 2003). A section of the questionnaire is devoted to the perception that commuters have about mobility infrastructures and policies in their area: respondents are asked to state how (un)satisfactory are bike lanes, bike sharing, public transport capillarity, local authorities commitment and urban mobility plans ("very unsatisfactory" to "very satisfactory"). The questionnaire ends with a section dedicated to socio-demographic profiling of respondents, and two last questions investigating whether they enjoy driving a car (and, if so, how much on a 5 point likert scale) and the main reasons hindering the adoption of sustainable transport modes (comfort of cars, long-established routines, high costs, unsatisfactory capillarity of public transport).

5. Results and policy implications

To analyse the role of different predictors on the intention to use private cars or alternative transportation modes for daily commutes we perform correlational and regression analyses. The following tables illustrate the correlation matrix (Spearman's ρ) between the considered predictors (habits, attitudes, subjective norms and PBC):

[3] We controlled for the reliability of the Self Reported Habit Index scale in terms of internal consistency, by calculating the Cronbach Alpha: the tests confirm the high reliability of the scale, with Cronbach Alphas of 0.961 and 0.935 with reference to SRHI on car use and alternative modes of transport, respectively.

Table 4a: Correlation Matrix (car use)

			Habits Car	Intention	Attitudes	S. norms	PBC
Spearman's ρ	Habits Car	Correlation Coefficient	1,000	,669**	,191**	,146**	,497**
		Sig. (2-tailed)	.	,000	,000	,002	,000
		N	436	436	436	436	436
	Intention	Correlation Coefficient	,669**	1,000	,213**	,131**	,501**
		Sig. (2-tailed)	,000	.	,000	,006	,000
		N	436	446	436	436	436
	Attitudes	Correlation Coefficient	,191**	,213**	1,000	,338**	,337**
		Sig. (2-tailed)	,000	,000	.	,000	,000
		N	436	436	436	436	436
	Subj. Norms	Correlation Coefficient	,146**	,131**	,338**	1,000	,283**
		Sig. (2-tailed)	,002	,006	,000	.	,000
		N	436	436	436	436	436
	PBC	Correlation Coefficient	,497**	,501**	,337**	,283**	1,000
		Sig. (2-tailed)	,000	,000	,000	,000	.
		N	436	436	436	436	436

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4b: Correlation Matrix (sustainable modes)

			Habits	Intention	Attitudes	S. Norms	PBC
Spearman's rho	Habits Green	Correlation Coefficient	1,000	,539**	,201**	,066	,383**
		Sig. (2-tailed)	.	,000	,000	,168	,000
		N	436	436	436	436	436
	Intention	Correlation Coefficient	,539**	1,000	,262**	,161**	,446**
		Sig. (2-tailed)	,000	.	,000	,001	,000
		N	436	446	436	436	436
	Attitudes	Correlation Coefficient	,201**	,262**	1,000	,365**	,270**

		Sig. (2-tailed)	,000	,000	.	,000	,000
		N	436	436	436	436	436
	S. Norms	Correlation Coefficient	,066	,161**	,365**	1,000	,282**
		Sig. (2-tailed)	,168	,001	,000	.	,000
		N	436	436	436	436	436
	PBC	Correlation Coefficient	,383**	,446**	,270**	,282**	1,000
		Sig. (2-tailed)	,000	,000	,000	,000	.
		N	436	436	436	436	436

**. Correlation is significant at the 0.01 level (2-tailed).

The core statistical technique adopted to analyze the data is logistic regression, which is adequate when the dependent variable is dichotomous (Hair et al. 2010). The principle of logistic regression is to link the occurrence or non-occurrence of an event to explanatory variables. In our survey, the event is represented by the choice of a travel mode (either private car or alternative/sustainable transport modes, according to the specific analysis) for future commutes. To simplify the notations, we will label the two events "car use" and "sustainable transport", respectively. As a proxy for car use and sustainable transport, we use the (high) intention of a commuter to use a specific transport mode in the upcoming weeks. That is, if we focus on sustainable transport, our dependent variable (y) in logistic regression can assume two values: 0, if it doesn't occur (the commuter does not use sustainable transport) or 1, if it does occur (the commuter uses sustainable transport). The explanatory variables are represented by attitudes (x_1), subjective norms (x_2), PBC (x_3) and habits (x_4), with x_1, x_2 and x_3 representing the three Planned Behavior constructs. Conditions for the reliability of logistic regression are met, and the correlation analysis confirms that multicollinearity is not present. The basic analytical expression of the logistic regression model is:

$$p = \exp(\beta X) / (1 + \exp(\beta X))$$

where βX represents the linear combination of variables (including constants). After the estimation of the β parameters, we estimate the probability of individuals to have strong intentions towards a specific modal choice, according to the (high or low) value of the explanatory variables. If one single explanatory variable is inserted in the model, we apply the following formula (Field 2009):

$$P(Y) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1)}}$$

in which P(Y) is the probability of Y occurring (Y=1), *e* is the base of natural logarithms, and the other coefficients form a linear combination.

On the other hand, if the model encompasses multiple explanatory variables, the following formula applies[4]:

$$P(Y) = \frac{1}{1 + e^{-(\beta_0+\beta_1 x_1+\beta_2 x_2+\beta_3 x_3+\beta_4 x_4)}}$$

Tables 5a and 5b summarize the results of the regression analysis.

Table 5a: Regression analysis (car use)

Variables in equation						
Habits (car use)	B	S.E.	Wald	df	Sig.	Exp(B)
	2,785	,263	111,825	1	,000	16,206
Constant	-0,534	,153	12,228	1	,000	0,586
Dependent variable: Intention to use car	Model Summary and Probabilities of Intention car use high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when X=0	P(Y=1) when X=1
	1	400,914	,285	,399	36,96%	90,47%
Variables in equation						
Attitudes (car use)	B	S.E.	Wald	df	Sig.	Exp(B)
	,915	,244	14,005	1	,000	2,496
Constant	,023	,214	,011	1	,915	1,023
Dependent variable: Intention to use car	Model Summary and Probabilities of Intention car use high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when X=0	P(Y=1) when X=1
	1	547,24	,031	,043	50,57%	71,87%
Variables in equation						
Subjective Norms (car use)	B	S.E.	Wald	df	Sig.	Exp(B)
	,988	,331	8,889	1	,003	2,686
Constant	-,147	,313	,219	1	,640	,864
Dependent variable: Intention to use car	Model Summary and Probabilities of Intention car use high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when X=0	P(Y=1) when X=1
	1	552,263	,020	,027	46,33%	69,87%
Variables in equation						
Perceived Behavior	B	S.E.	Wald	df	Sig.	Exp(B)
	2,283	,310	54,074	1	,000	9,802

[4] In this case, all four explanatory variables are inserted in the model

Control (car use)						
Constant	-1,159	,287	16,367	1	,000	,314
Dependent variable: Intention to use car	Model Summary and Probabilities of Intention car use high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when X=0	P(Y=1) when X=1
	1	496,021	,136	,190	23,88%	75,47%

Table 5b: Regression analysis (sustainable transport)

Variables in equation						
	B	S.E.	Wald	df	Sig.	Exp(B)
Habits Green	1,901	,218	76,205	1	,000	6,690
Constant	-1,119	,143	61,342	1	,000	,327
Dependent variable Intention to use sustainable transport	Model Summary and Probabilities of Intention to use sustainable transport high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when X=0	P(Y=1) when X=1
	1	508,742	,176	,237	24,62%	68,61%
Variables in equation						
	B	S.E.	Wald	df	Sig.	Exp(B)
Attitudes Green	1,104	,223	24,603	1	,000	3,018
Constant	-1,071	,190	31,623	1	,000	,343
Dependent variable Intention to use sustainable transport	Model Summary and Probabilities of Intention to use sustainable transport high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when X=0	P(Y=1) when X=1
	1	581,896	,058	,078	25,52%	50,82%
Variables in equation						
Subjective Norms Green	B	S.E.	Wald	df	Sig.	Exp(B)
	,552	,249	4,897	1	,027	1,737
Constant	-,744	,226	10,868	1	,001	,475
Dependent variable Intention to use sustainable transport	Model Summary and Probabilities of Intention to use sustainable transport high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when all X=0	P(Y=1) when all X=1
	1	603,405	,011	,015	32,21%	45,21%
Variables in equation						
Perceived Behavior Control Green	B	S.E.	Wald	df	Sig.	Exp(B)
	1,435	,229	39,306	1	,000	4,198

Constant	-1,291	,197	43,137	1	,000	,275
Dependent variable Intention to use sustainable transport	Model Summary and Probabilities of Intention to use sustainable transport high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when X=0	P(Y=1) when X=1
	1	564,224	,094	,127	21,57%	53,59%
Put all Variables in equation						
	B	S.E.	Wald	df	Sig.	Exp(B)
Habits	1,787	,232	59,195	1	,000	5,970
Attitudes	,982	,272	13,061	1	,000	2,670
PBC	1,249	,273	20,948	1	,000	3,487
Constant	-2,679	,311	73,949	1	,000	,069
Dependent variable Intention to use sustainable transport	Model Summary and Probabilities of Intention to use sustainable transport high					
	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	P(Y=1) when all X=0	P(Y=1) when all X=1
	1	460,044	,263	,354	6,42%	79,23%

Some preliminary considerations emerge if we compare these results with most empirical evidence on the correlates of modal choice (see Lanzini & Khan 2017). For commuters in Santa Catarina, the choice between private car and sustainable transport modes shows higher correlations with PBC and lower correlations with attitudes and subjective norms. So, if we focus on sustainable transport modes, commuters seem to perceive the inadequacy of available options: they would like to use green, environment-friendly transport modes but they feel this being difficult to them, so they recover to private car use (even if they don't like it) because they see no viable alternatives. Also, commuters in Florianópolis display deeply rooted car use habits, this representing a factor that deactivates the search for information about alternatives and even the willingness to consider new options that might come along. This is particularly problematic for policy makers, as car drivers are a difficult target for communication campaigns focusing on the benefits of alternative transport modes or on the improvements of the public transport system. Furthermore, campaigns focusing on the social aspect of sustainable transport modes would be scarcely effective in Florianópolis, as data suggest that commuters (unlike in other national contexts) do not perceive social pressure as a relevant driver of their choices, and are not affected by behavioral patterns adopted by peers and members of social circles.

The data are consistent with growing concerns about the inadequacy of existing public transportation networks. Schedules are not fully reliable and the integration between different bus lines is not optimal, with detrimental impacts on the travel time and the effectiveness of the whole

network. There are improvements under way, such as the possibility to use apps that trace the position of buses, thus providing a fairly accurate estimate of the waiting time at each bus station. Moreover, there are plans to introduce innovative solutions such as the BRT (a rapid transit system for buses), yet they are still in the design phase, and it is not clear when the new system will come into force, and what could its effective impact be. PLAMUS (Plano de Mobilidade Urbana Sustentavel) represents an overarching attempt at analyzing urban mobility in the Great Florianópolis area, as to reshape the system focusing on the improvement of public transportation network and infrastructures as well as on a new institutional framework[5].

Notwithstanding efforts taking place to increase the effectiveness of public transport system, it is likely that more radical changes are needed, if the city wants to avoid a worsening of the already critical mobility in the area, with an increase of the population and of the circulating fleet of private cars that would likely put under unbearable stress some key traffic nodes (such as the bridge to mainland), and viability as a whole. The whole public transportation planning should be carefully re-considered, and citizens should be able to express their opinion and be an active part in the process, with a participatory approach.

As concluding remarks, the article proposes a set of implications for policy, and suggestions policy makers might want to consider. In a nutshell, the main conclusions can be indeed summarized as follows:

1. “People cannot see options”. Commuters do not perceive that viable and convenient alternatives are available. Strong car habits deactivate a rational process of consciously seeking and elaborating new information; more, they make most commuters insensible to communication campaigns, with messages that do not reach the target. Yet, it is of paramount importance to start a process of commuters’ education, about the set of alternatives that are already available, and the (often unseen) advantages they would bear. More instructions on how to exploit the existing network of public transports, for instance, should be provided.

2. “New models need to be considered”. Increasing awareness (and perceived control) over the alternatives already available is clearly a first step that is not sufficient to promote a genuine shift to a more sustainable paradigm of urban mobility in Florianópolis. Indeed, it is necessary to consider new models (such as those envisaged by the PLAMUS), leaving the muddy banks of the design phase to set the sails into implementation. For instance, it could be discussed in detail the potential of an increased use of maritime transportation. It is likely that, given the specific location of the city, mobility could heavily benefit from integrating into the existing network a system of ferryboats for the transportation of passengers and, in some cases, cars and vehicles. A potential

[5] http://www.plamus.com.br

barrier might be represented by an aversion for such transport mode, fostered by its novelty (and the uncertainties it hence represents in the mind of commuters) and a widespread convincement that ferryboats are "for tourists", and not for commuters going to the workplace. Further, better integration between different modes (i.e., taxis, buses, cars, bikes and so on) should be envisaged. Instead of focusing on single pieces of the puzzle with no overarching vision about the system, more efforts should be put on exploiting possible synergies focusing on how different parts could coexist. It is the case, for instance, of bikes and buses. While the city has many kilometers of bike lanes, some areas of the city are poorly connected and it is not possible to park bikes at main bus terminals as to exploit the potential of inter-modal commute.

3. "Hard choices on the horizon". Politicians might be asked to make hard (and unpopular) decisions. For instance, the partial closure to vehicular traffic of the city center, with only residents able to entering the inner ring. Albeit a common policy in many Countries, this would be a novelty in Brazil, and as such it would inevitably encounter resistance and a period of dissatisfaction among commuters, which would be asked to change their behavioral patterns. However, this would open "windows" of opportunity for behavioral changes (Verplanken et al. 2008), and commuters would be asked to consider new alternatives that might in turn emerge as more convenient and comfortable. It is opinion of the authors that, after a period of adjustment, the population would begin to appreciate these new policies, enjoying the benefits in terms of lower congestion and pollution.

4. "New approach to mobility". Politicians need to understand that mobility is more than just traffic. It represents a complex construct, encompassing intertwining social, economic and environmental issues. As such, it cannot be addressed simply focusing on infrastructures and traffic management. More importantly, policy makers typically adopt a top-down approach, where decisions are taken upstream, and citizens are considered merely as "end-users" that will adapt to the new, implemented strategy. On the other hand, the involvement of the community is an essential prerequisite for any urban mobility policy to be successful. Commuters and the community at large need to be an active player in the design of such policies. Their voice needs to be heard, as shedding light on their needs, concerns and on the motives underpinning their behaviors would represent a key-asset to increase the effectiveness of future strategies. Indeed, modern concepts of sustainable urban mobility include involvement of the community as a prerequisite for any plan to succeed: "The Local Planning Authority should involve the relevant actors - citizens, as well as representatives of civil society and economic actors [...] from the outset and throughout the process to ensure a high level of acceptance and support." (EU 2013).

Appendix: online survey

- On a typical day, how many km do you travel for your commuting?

- On a typical day, how much time (hours and minutes) do you spend on your commuting?

- How often, over the past 12 months, did you use the following means of transportation? (1=never; 5=very often)
a. private car
b. transport mode alternative to private car (any type)

- Please specify the type of fuel of the private car:
- gasoline; diesel; ethanol; natural gas; electric vehicle

- As regards modes of transportation alternative to private car, how often over the past 12 months did you use each of the following? (1=never; 5=very often)
- car sharing; bicycle; motorbike; train; bus; subway; taxis; car pool; walking (short distance, less than 2 km); walking (long distance, over 2 km)

- My intention to use (each of the following transport modes) for my daily commutes in the coming weeks is: (1=very weak; 5= very strong)
a. private car
b. transport mode alternative to private car (any type)
c. car sharing; bicycle; motorbike; train; bus; subway; taxis; car pool; walking (short distance, less than 2 km); walking (long distance, over 2 km)

- To me, using (each of the following travel modes) in the future would be (1= very unpleasant; 5= very pleasant)
a. private car
b. transport mode alternative to private car (any type)
c. car sharing; bicycle; motorbike; train; bus; subway; taxis; car pool; walking (short distance, less than 2 km); walking (long distance, over 2 km)

- My relevant ones would approve that I use (each of the following alternatives) as transport mode (1= totally disagree; 5= entirely agree)
a. private car
b. transport mode alternative to private car (any type)
c. car sharing; bicycle; motorbike; train; bus; subway; taxis; car pool; walking (short distance, less than 2 km); walking (long distance, over 2 km)

- To me, using (each of the following modes) for my daily commute would be (1= extremely difficult to 5= extremely easy)
a. private car
b. transport mode alternative to private car (any type)
c. car sharing; bicycle; motorbike; train; bus; subway; taxis; car pool; walking (short distance, less than 2 km); walking (long distance, over 2 km)

- Using transport modes alternative to private car is something that: (1=totally disagree; 5= entirely agree)
I do frequently; I do automatically; I do without having to consciously remember; makes me

feel weird if I do not do it; I do without thinking; would require effort not to do it; belongs to my (daily, weekly, monthly) routine; I start doing before I realize I'm doing it; I would find hard not to do; I have no need to think about doing; that's typically 'me';I have been doing for a long time.

- Using private car is something that: (1=totally disagree; 5= entirely agree)

I do frequently; I do automatically; I do without having to consciously remember; makes me feel weird if I do not do it; I do without thinking; would require effort not to do it; belongs to my (daily, weekly, monthly) routine; I start doing before I realize I'm doing it; I would find hard not to do; I have no need to think about doing; that's typically 'me';I have been doing for a long time.

- How much do you believe air pollution and energy consumption represent a menace for the biosphere and for humans? (1=not at all; 5= very serious)

- How much do you believe private car use contributes to such problem? (1=not at all; 5= very much)

- Do you perceive as a moral obligation the reduction of car use? (1=not at all; 5= very much)

- How much do you agree with each of the following statements? (1= totally disagree; 5= entirely agree)

When I use a car, there are gas emissions that have a negative impact on climate.
When I use a car, there are gas emissions that have a negative impact on health of men, especially elderly people and children
My use of car will have a negative impact on the quality of life of future generations.
I feel personally responsible for problems connected to private car use
My use of cars contributes to the worsening of environmental problems
My use of cars represents a problem for society
Using car for my daily commutes makes me feel good
Using car for my daily commutes makes me feel guilty
I feel a moral obligation to reduce the use of car
I could think of many ways to combat greenhouse effect
I wouldn't know which activities to undertake in order to mitigate smog concentrations
My family members use private car in their daily commutes.
My family members use alternative transport modes in their daily commutes.
My best friends use private car in their daily commutes.
My best friends use alternative transport modes in their daily commutes.

- How often do you adopt the following behaviors? (1= never; 5= always)

- recycling; purchasing eco-labeled food products; purchasing eco-labeled non-food products; curtailing water use to save resources; switching off lights when exiting room; green voluntarism/activism

- How do you consider each of the following items as a menace to the environment? (1= very small menace; 5= very big menace)

Industrial emissions; Traffic emissions; Oil spills from marine platforms; Industrial waste; Household/citizen waste; Extinction of plants and animals; Chemicals used in agriculture; Nuclear waste; Depletion of ozone layer

- Rank in order of personal relevance the following values from 1(the most relevant to you) to 7 (the least relevant to you). Drag the options in the desired position
True friendship; Environmental protection; Equality; Safety; Social power; Wealth; Authority

- How do you rate (1= very unsatisfactory; 5= very satisfactory) the following issues in your area?
bike lanes; urban mobility plans; capillarity of the transport network; willingness of local authorities to promote sustainable mobility; bike sharing availability

- Do you have a driving license? (yes/no)

- (if yes:) Do you enjoy driving a car? (1=not at all; 5=a lot)

- Please indicate how much does each of the following issues affect your choice not to adopt sustainable travel modes (1= totally disagree; 5= entirely agree):
Private car is more comfortable; I am used to private car and I do not consider alternatives; My area is poorly served by public transportation; Public transportation is costly

- Age (years)

- Gender (m/f)

- Are you a student? (yes/no)

- (if yes): UDESC; UFSC; other University; other school

- (if no:) what is your occupation? (unemployed; retired; autonomous worker; dependent worker)

- Where do you live?
Florianópolis; Florianópolis metropolitan area (São Jose, Palhoça, Biguaçu, etc.); other cities in Santa Catarina; other cities in Brazil

- How would you rate your household income? (1=very low; 5= very high)

- Are you a religious person? (1=not at all; 5= very much)

- How would you rate your political views? (1= very progressive – left; 5= very conservative – right)

References

Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: automaticity in goal-directed behavior. Journal of personality and social psychology, 78(1), 53.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.

Bamberg, S., & Schmidt, P. (2003). Incentives, morality, or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz, and Triandis. Environment and Behavior, 35(2), 264–285.

Bergman, L., & Rabi, N. I. (2005). Mobilidade e política urbana: subsídios para uma gestão integrada. Rio de Janeiro: IBAM.

COM (2009) Action Plan on Urban Mobility. Com 2009/490, European Commission, Brussels.

COM (2011) Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. European Commission, Brussels.

COM (2013) The Urban Mobility Package "Together towards competitive and resource-efficient urban mobility". COM 2013, Brussels.

Da Silva, A. N. R., da Silva Costa, M., & Macedo, M. H. (2008). Multiple views of sustainable urban mobility: The case of Brazil. Transport Policy, 15(6), 350-360.

Da Silva, A. N. R., da Silva Costa, M., & Macedo, M. H. (2016). Integrated planning, spatial organization and sustainable mobility in the context of Brazilian cities. In "City and Movement: mobilities and interactions in urban development" Ed. Balbim, R., Krause, C., & Cunha Linke C. Brasilia, 2016

Donald, I. J., Cooper, S. R., & Conchie, S. M. (2014). An extended theory of planned behaviour model of the psychological factors affecting commuters' transport mode use. Journal of Environmental Psychology, 40(December), 39–48.

Dunlap, R. E., & Van Liere, K. D. (1978). The "new environmental paradigm". *The journal of environmental education*, *9*(4), 10-19.

Field, A. (2009). Discovering statistics using SPSS. Third Edition.Sage publications.

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis. Seventh Edition. Pearson Prentice Hall, New Jersey.

Heath, Y., & Gifford, R. (2002). Extending the theory of planned behavior: Predicting the use of public transportation. Journal of Applied Social Psychology, 32 (10), 2154–2189.

Hunecke, M., Haustein, S., Böhler, S., & Grischkat, S. (2010). Attitude-based target groups to reduce the ecological impact of daily nobility behavior. Environment and Behavior, 42(1), 3–43.

Lanzini, P. (2017). Responsible Citizens and Sustainable Consumer Behavior: New Interpretive Frameworks. Routledge, New York.

Lanzini, P., & Khan, S. A. (2017). Shedding light on the psychological and behavioral determinants of travel mode choice: A meta-analysis. Transportation Research Part F: Traffic Psychology and Behaviour, 48, 13-27.

Lanzini, P., & Stocchetti, A. (2017). Evolution of the Conceptual Basis for the Assessment of Urban Mobility Sustainability Impacts. Department of Management Working Paper Series, Ca' Foscari University, Venice.

Manstead, A. S., & Parker, D. (1995). Evaluating and extending the theory of planned behaviour. European Review of Social Psychology, 6(1), 69–95.

Ministério das Cidades (2006). Guia PlanMob para Elaboracao dos Planos Diretores de Transporte e Mobilidade. Secretaria Nacional de Transportes e da Mobilidade Urbana, Brasilia, Brazil, May 2006.

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. Psychological bulletin, 124(1), 54.

Schwartz, S. H. (1977). Normative influences on altruism. Advances in experimental social psychology, 10, 221-279.

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values?. Journal of social issues, 50(4), 19-45.

Schwartz, S. H., & Howard, J. A. (1981). A normative decision-making model of altruism. Altruism and helping behavior, 189-211.

Steg, L. (2005). Car use: Lust and must. Instrumental, symbolic and affective motives for car use. Transportation Research Part A: Policy and Practice, 39(2–3), 147–162.

Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. Journal of social issues, 56(3), 407-424.

Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. Human ecology review, 81-97.

Thøgersen, J., & Ölander, F. (2003). Spillover of environment-friendly consumer behaviour. Journal of environmental psychology, 23(3), 225-236.

Triandis, H. C. (1977). Interpersonal behavior. Brooks/Cole Pub. Co.

Vasconcellos, E.A., (2001). Urban Transport, Environment and Equity—The Case for Developing Countries. Earthscan, United Kingdom.

Verplanken, B., & Aarts, H. (1999). Habit, attitude, and planned behaviour: is habit an empty construct or an interesting case of goal-directed automaticity?. European review of social psychology, 10(1), 101-134.

Verplanken, B., & Orbell, S. (2003). Reflections on past behavior: A self-report index of

habit strength. Journal of Applied Social Psychology, 33(6), 1313-1330.

Verplanken, B., Aarts, H., Knippenberg, A., & Knippenberg, C. (1994). Attitude versus general habit: Antecedents of travel mode choice. Journal of Applied Social Psychology, 24(4), 285-300.

Verplanken, B., Aarts, H., Knippenberg, A., & Moonen, A. (1998). Habit versus planned behaviour: A field experiment. British journal of social psychology, 37(1), 111-128.

Verplanken, B., Walker, I., Davis, A., & Jurasek, M. (2008). Context change and travel mode choice: Combining the habit discontinuity and self-activation hypotheses. Journal of Environmental Psychology, 28(2), 121-127.