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# New Insight in the Field of Sustainable Transportation

A Multilevel Analysis of Material Innovation in the Practice of Public Transportation in the EU

Master's thesis in Sociology

Supervisor: Hilde Bjørkhaug

June 2020



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Faculty of Social and Educational Sciences  
Department of Sociology and Political Science



# Abstract

This thesis sets out to provide new insight into the field of sustainable transportation by combining the theoretical perspective of social practice theory with a cross-sectional multilevel analysis. To my knowledge, this specific theoretical and methodological combination is one of the first of its kind. As such, one of the aims for this thesis is to spark discussion about the possibilities of using social practice theory in tandem with a cross-sectional multilevel analysis.

More specifically, the topic of this thesis is sustainable innovation in the practice of public transportation. This proposed sustainable innovation is presented in the form of a referendum, where respondents are asked if they are willing to pay more taxes for a new, more notably sustainable, fleet of transportation. The aim is to discern characteristics of practitioners who want this innovation to materialize. This is researched through Gert Spaargaren's (2000) social practice theoretical perspective, which combines the social practice theory with that of ecological modernization.

To discern these characteristics, logistic multilevel modelling is employed. The data used is provided by ECHOES (2019) and a total of 31 countries from the EU lay the foundation for the analysis. These countries are EU-28, plus Norway, Switzerland and Turkey. Multilevel modelling is argued to be a potentially fruitful model for mapping social practices, as level-two explanatory variables enable further contextualization of practices.

The findings from the multilevel model reveal that potential future carriers of this new system of public transportation are young, affluent, left-wing and highly educated. Moreover, these practitioners reside in urban areas, possess the necessary skills for commuting and are eco-conscious. The level-two explanatory variables elucidate variation between practitioners belonging to different countries. Thus, practitioners who live in countries with either a high GDP per capita or a large share of public transportation (of total inland transport) are more in tune with the idea of a new fleet of public transportation.

Although these practitioners are characterized as left-wing, there are differences between left-wing and right-wing practitioners depending on how their welfare state has evolved politically and historically. This sheds light on how the act of voting on a referendum regarding public transportation cannot be understood by only focusing on the practice of public transportation.

From a sustainability perspective, this thesis accentuates the need for greening transportation practices in order to reduce CO<sub>2</sub> emissions. Focusing in on social practices emphasize how sustainability is a result of changing unsustainable elements in practices and, not by changing individual behavior, or going behind the back of consumers by brute forcing changes in infrastructure.

# Sammendrag

Denne avhandlingen søker å tilføre ny innsikt til forskningsfeltet om bærekraftig transport ved å kombinere det teoretiske perspektivet social practice theory med en tverrsnitts flernivåanalyse. Så langt jeg vet, er denne spesifikke kombinasjonen av teori og metode som er gjort her en av de første av sitt slag. Med dette som bakteppe, er ett av målene for avhandlingen å fremme diskusjon rundt mulighetene av å bruke social practice theory i samspill med en tverrsnitts flernivåanalyse.

På et mer konkret nivå er temaet i avhandlingen bærekraftig innovasjon i offentlig transport som *practice*. Den nevnte bærekraftige nytenkningen er presentert i et lovforslag som spør om respondenter er villige til å betale mer skatt, hvis et nytt, bærekraftig, offentlig transport-system blir tatt i bruk. Formålet er å kartlegge hva som kjennetegner forbrukere som ønsker at denne innovasjonen skal finne sted. Jeg har benyttet Gert Spaargaren's (2000) social practice perspektiv, hvor han knytter social practice theory sammen med økologisk modernisering.

Logistisk flernivåanalyse blir anvendt for å skjelne egenskaper hos forbrukerne. Dataen som er brukt er stilt til disposisjon av ECHOES (2019) og datasettet inneholder totalt 31 land fra EU. De nevnte landene er EU-28, i tillegg til Norge, Tyrkia og Sveits og de legger grunnlaget for analysen. Flernivåanalyse har potensiale for å være en positiv bidragsyter til social practice theory ved at practices kan kartlegges på et kontekstuellet nivå, og dette blir muliggjort ved at nivå-to forklaringsvariabler kan inkluderes.

Funnene fra flernivåanalysen viser at potensielle kandidater for bruk av det nye offentlige transport-systemet er unge, velstående, tilhører venstresiden og er høyt utdannet. I tillegg så bor disse forbrukerne i urbane områder, de besitter den nødvendige kunnskapen for å benytte offentlig transport, og de er miljøbevisste. Nivå-to variablene påviser at det er variasjoner mellom forbrukere i henhold til hvilket land de tilhører. Ut i fra dette kartlegges det at forbrukere som bor i land som enten har høy BNP per innbygger eller en stor andel offentlig transport (av total innlandstransport) er mer mottakelige for ideen om et nytt offentlig transport-system.

Selv om disse forbrukerne kjennetegnes ved at de tilhører venstresiden, så er det forskjeller mellom venstre- eller høyreorienterte forbrukere som avhenger av hvordan de respektive velferdsstater har utviklet seg politisk og historisk. Dette kaster lys over hvordan det å stemme på et lovforslag ikke kan forstås ved å kun fokusere på offentlig transport som en practice.

Fra et bærekraftsperspektiv så påpeker denne avhandlingen nødvendigheten av å gjøre transport practices grønnere, slik at CO<sub>2</sub> utslipp blir redusert. Et fokus på social practices viser hvordan bærekraft er en konsekvens av å luke ut lite miljøvennlige elementer i practices, og at det ikke er et resultat av endring i individuell oppførsel, eller av å gå bak ryggen på forbrukere ved å påtvinge infrastrukturelle endringer.

# Preface

Jeg vil først og fremst takke veilederen min, professor ved NTNU Hilde Bjørkhaug, som har veiledet med stø hånd gjennom hele prosessen. Du har sett muligheter og ikke begrensninger ved oppgaven, og det setter jeg stor pris på. Takk for et fint samarbeid.

Videre vil jeg takke Emilie, som med sitt skarpe blikk for grammatiske feil har lest korrektur på oppgaven. En takk går til Gro og Kika som har hjulpet til med utforming av tabeller og grafer, samt strukturen på oppgaven.

Til slutt, tusen takk til alle jeg har delt studietiden med.

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Eivind Hjort Matthiasen





# Table of contents

Figures .....	xi
Tables .....	xi
1 Introduction .....	1
1.1 A Defining Issue of our Time .....	1
1.2 Stark Increase in Emissions .....	1
1.3 Dominating Perspectives, New Practices .....	2
1.4 Structure of my Thesis.....	4
2 Theory.....	5
2.1 The First Generation of Social Practice Theory: The Origins.....	5
2.2 The Second Generation of Social Practice Theory: Re-interpretations.....	6
2.3 Social practices: Entities and Performances .....	7
2.4 The Elements of Social Practice .....	8
2.5 Social Practice Theory and Sustainable Consumption.....	9
2.6 Social Practice Theory: Spaargaren and Ecological Modernization .....	10
2.7 Spaargaren’s Analytical Approach .....	11
2.7.1 Strategic Conduct Analysis: Sustainable Lifestyles.....	12
2.7.2 Institutional Analysis: Systems of Provision .....	13
2.8 Esping Andersen’s Theory on Welfare Regimes .....	13
2.8.1 Six Types of Regimes.....	14
3 Literature Review.....	17
3.1 The Field of Consumption: An Overview .....	17
3.2 Soft Policies and Hard Measures in the Field of Transportation.....	18
3.3 Social Practice Theory Applied on Transportation .....	19
3.4 Qualitative is the Norm, but Quantitative is an Opportunity.....	22
4 Methodology .....	23
4.1 The Vibrancy of ECHOES.....	23
4.1.1 The Reliability of ECHOES.....	24
4.1.2 The Validity of ECHOES.....	24
4.2 Choosing Multilevel Analysis as a Model .....	25
4.2.1 My Theoretical Reasoning .....	25
4.2.2 My Methodological Reasoning .....	26
4.3 Multilevel Models: An Introduction .....	27
4.4 Assessment of Multilevel Models .....	27
4.4.1 Number of Countries a Possible Challenge .....	27
4.4.2 Assumptions for the Model .....	28

4.5	Explaining Pubtranstax .....	30
4.6	Explaining Independent Variables .....	31
4.6.1	Socio-demographic Characteristics .....	32
4.6.2	On Materials, Competences and Meanings .....	34
4.6.2.1	Materials .....	34
4.6.2.2	Competences .....	35
4.6.2.3	Meanings .....	35
4.6.3	Explaining Country-Level Variables .....	36
4.6.3.1	Gross Domestic Product per Capita .....	37
4.6.3.2	Share of Public Transportation .....	37
4.6.3.3	The Six Types of Welfare Regimes .....	38
4.7	Exploring the Possibilities .....	38
5	Results .....	40
5.1	Introducing the Intercept-only Model .....	40
5.2	The Models Step-by-step .....	42
5.2.1	The Socio-demographics of Carriers .....	43
5.2.2	Materials, Competences, Meanings .....	44
5.2.3	Understanding the Contextual Factors .....	45
6	Discussion .....	48
6.1	Who are the Carriers of Public Transportation? .....	49
6.2	How Does Materials, Competences and Meanings of Public Transportation Affect Practitioners' Vote? .....	52
6.2.1	The Material Element of Public Transportation .....	53
6.2.2	The Competence Element of Public Transportation .....	54
6.2.3	The Meaning Element of Public Transportation .....	54
6.3	How Does Public Transportation as a Bundled Practice Affect Practitioners' Vote? ..	56
6.3.1	How High GDP Enables Green Thinking .....	57
6.3.2	The Importance of Accessible Public Transportation .....	58
6.3.3	Why Left is Not Necessarily Right .....	59
6.4	Summing up the Characteristics .....	61
6.5	Understanding Innovation .....	62
6.6	An Opportune Time .....	64
7	Conclusion .....	65
7.1	Weeding out Elements, not Individuals .....	65
7.2	For Future Studies .....	68
	Bibliography .....	69
	Appendix .....	78

# Figures

Figure 1 Share of EU greenhouse gas emission by source, 2017 .....	2
Figure 2 Model of social practice theory .....	12
Figure 3 Hosmer-Lemeshow test .....	29
Figure 4 Curvilinear effect of monthly income.....	44
Figure 5 Indirect relationship .....	45
Figure 6 Cross level interaction .....	46

# Tables

Table 1 Overview of elements .....	8
Table 2 Agency/structure.....	17
Table 3 Summary of SPT literature .....	21
Table 4 Descriptive statistics .....	32
Table 5 Intercept-only model .....	41
Table 6 Multilevel regression models .....	42
Table 7 Representativity in ECHOES.....	78

# 1 Introduction

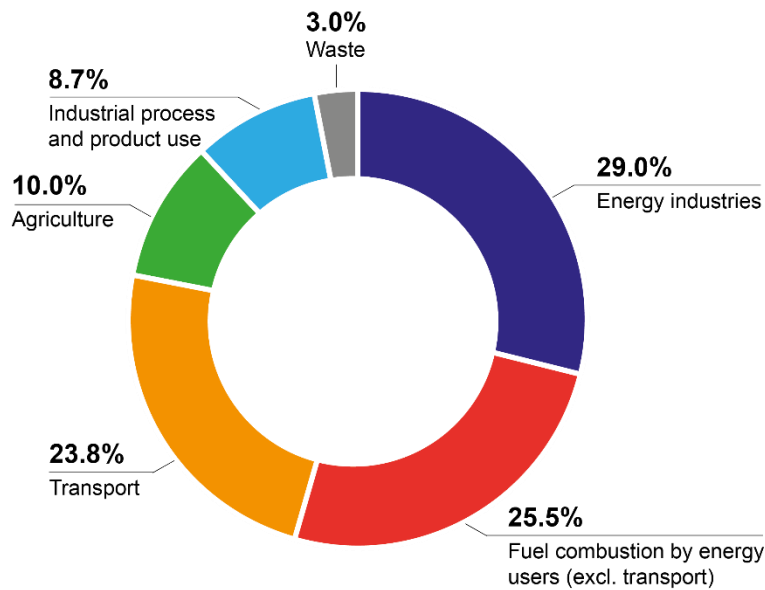
## 1.1 A Defining Issue of our Time

Global warming is a defining issue of our time. On 11<sup>th</sup> December, 1997, the Kyoto Protocol was launched with the aim of reducing emission of greenhouse gases (UNFCCC, n.d.). The protocol was ratified in 2005 creating an international coalition of countries. One year after the Kyoto protocol was ratified, Tony Blair proclaimed in his valedictory speech: "Global warming is the greatest long-term threat to our planet's environment" (The Guardian, 2006, 26. September). Fast forward to 2019, and an unprecedented amount of people across the world took to the streets in a climate protest to make their voices heard (Rodriguez, 2019, 21. September). This worldwide demonstration took place in 185 countries and was led by the young activist Greta Thunberg, who has become a representative figure of a new generation wanting to make a change. The last decades have seen climate related issues rise to the forefront of the news.

Global warming is a unique challenge for humanity, as no one is exempt from the ramifications of rising temperatures. United Nations Intergovernmental Panel on Climate Change (2018) stresses that the current trajectory of global warming is headed towards 1.5°C above pre-industrial levels sometime between 2030 and 2052. This increase in global temperature could have devastating effects for biodiversity and eco-systems; cause deteriorating health; spark a shortage of food supply and lead to extreme weather, and the list goes on. Furthermore, global warming is anthropogenic, and the temperature is rising due to excessive amounts of greenhouse gasses (GHG) being let out into the atmosphere. Out of the different GHGs, carbon dioxide (CO<sub>2</sub>) is one of the main driving factors behind global warming.

## 1.2 Stark Increase in Emissions

A plethora of international organizations have set climate goals for their member countries, and the EU is no exception. The 2030 climate and energy framework (2014) states that member countries have to reduce GHG emissions with at least 40% from 1990 levels, at the earliest within 2021, and 2030 at the latest. As of 2017 the total emissions from the EU had gone down by 19% in comparison with the levels from 1990. Figure 1 shows the distribution of GHG emission by sector (Eurostat, 2020a).



(EEA, 2020)

**Figure 1 Share of EU greenhouse gas emission by source, 2017**

What is interesting is that by and large every sector has decreased its GHG emission levels since 1990, except for transportation. There has been a stark increase in the transportation sector from 14.8% in 1990, to 23.8% in 2017 (Eurostat, 2020a). This negative trend is hard to grapple, as people are continually using private vehicles as mobility options. This is highlighted by the fact that in the transportation sector, emissions from passenger cars amount to 60.7% of total emissions from road transport in the EU (European Parliament, 2019). As of today, it is widely known that the transportation system is one of the main culprits of CO<sub>2</sub> emissions and that a decarbonization of this sector is sorely needed (Chu & Majumdar, 2012).

Therefore, a decrease in CO<sub>2</sub> emissions from passenger cars requires a modal shift, which entails another transportation option gaining a competitive advantage compared to passenger cars. Many challengers to private vehicles have been proposed in the literature on transportation, for instance: cycling; bike-sharing; walking and car-sharing. Another potential alternative to passenger cars is public transportation, as this mode of transport has the capability to contest the speed of travelling by car (Miller, de Barros, Kattan, & Wirasinghe, 2016, p. 1079). Additionally, public transportation frees up space because it can carry large quantities of passengers, whereas passenger cars in the EU on average transport 1.7 people per car (Pastori et al., 2018, p. 23). Consequently, public transportation causes less congestion and is a greener alternative compared to cars.

### 1.3 Dominating Perspectives, New Practices

In quest of reducing CO<sub>2</sub> emissions, plenty of previous research recognizes that many forms of consumptions are unsustainable. This research on sustainability has been pervaded by a presumption that consumers are rational actors that make the best decision for themselves when exposed to new information (Kennedy H. Emily, Cohen, & Krogman, 2015, p. 3). This view of consumers as rational individuals is significative of a

social psychological perspective and it has been an influential perspective that is often applied by policymakers (Hampton & Adams, 2018, p. 214). Policies that aim at informing consumers, such as public transport marketing and travel plans, are symptomatic of policies rooted in a social psychological perspective.

Meanwhile other branches of social science dominated the field of sustainable consumption, sociology lay dormant until recently. In a response to the predominant view of consumers as rational individuals, social practice theory (SPT) has gained newfound traction (Sahakian & Wilhite, 2014, p. 27). Social practice theory aims to chart sustainable change, but with a focus on everyday life and how individuals act routinely (Fraanje & Spaargaren, 2019, p. 500). The focus is removed from the individual and is placed on the entities that structure daily life, namely practices. A practice – for example cycling, using public transportation, cooking etcetera – consists of different elements that help guide individuals when they perform actions. Consequently, the focus lies on changing the unsustainable practices that individuals partake in, and not on changing individual behavior (Spaargaren & Mol, 2008, p. 350). Understanding unsustainable consumption through the lens of practices offers new opportunities for policymakers dealing with this issue, as they can attack the problem from new angles.

Newer versions of social practice theory puts emphasis on materials – pioneered by Reckwitz (2002) – as an essential element of practices. Simply put, approximately all practices require materials for individuals to perform the practice, for example playing a football match requires two goals, a football, a pitch etcetera. A theorist that has pursued Reckwitz's thought on materials is Spaargaren (2000), who aspires to combine the theory of ecological modernization with social practice theory. Spaargaren proclaims social practice theory should focus on individuals and how they appropriate environmental innovations.

With this in mind, this thesis investigates how respondents in the survey ECHOES (2019) would vote on a hypothetical referendum that asks if the respondent would pay more tax for a new, sustainable fleet of transportation. This inquiry touch on three important aspects mentioned in this introduction. Firstly, a new public transportation system is a mode of transportation that can challenge passenger cars, which is vital to reduce emissions. Secondly, practice theory allows us to lift our gaze from the individual to the practice of public transportation; consumers do not vote on the referendum based on their own preferences, but because of how practices are structured. Thirdly, it highlights an environmental innovation in the domain of public transportation. Thus, the overarching research question reads: *What characterizes consumers that want a material innovation in the practice of public transportation?*

Furthermore, three research questions are deduced from the overarching research question, to clarify how social practice theory highlight different characteristics of consumers. (1) *Who are the carriers of public transportation?* This research question aims to describe general socio-demographic characteristics of the potential users of the new public transportation system. (2) *How does materials, competences and meanings of public transportation affect practitioners' vote?* This question highlights the structural components of public transportation as a practice. Lastly, (3) *How does public transportation as a bundled practice affect practitioners' vote?* To understand how consumer vote on the referendum, other practices must be highlighted, as practices intersect each other.

## 1.4 Structure of my Thesis

The layout of the thesis is divided into seven chapters, of which introduction is the first. Up next is the chapter presenting the theoretical foundation, and it delves into how social practice theory has evolved from theorists that sought to bridge the gap between actor and structure (see Giddens (1984) and Bourdieu (1984)) to modern re-interpretations where Schatzki (2002) is seen as a leading figure. Following in Schatzki's footsteps is Reckwitz (2002), Warde (2005), Shove (2012) and Spaargaren (2000), to name a few. The aforementioned theorists provide the theoretical basis for this thesis. Furthermore, I will clarify Spaargaren's theoretical program, which is a fusion of practice theory and ecological modernization. Therefore, I give a brief synopsis of ecological modernization. In the last section of the theory chapter, Esping-Andersen's theory of welfare typologies, and an adaptation based on a fusion of welfare regime literature, is presented. The joining together of welfare regimes from different literary sources is well adapted to theorize the context in which practitioners make their choices.

The third chapter is a literature review that aims to chart previous research using social practice theory on the field of consumption. The chapter starts off with a general introduction of social practice theory literature, and then takes a deep dive into research on transportation. Firstly, literature belonging to the two most influential paradigms within the field of transportation are accounted for. Secondly, the chapter is brought to a close with an extensive overview of social practice theory research on transportation, and this overview lays the foundation for the subsequent choice of variables. The selection of variables is presented in the fourth chapter on methodology. In chapter four I also discuss the quality of the dataset and my model, in addition to presenting the method – multilevel analysis – that I will use. The fifth chapter includes the stepwise presentation of the multilevel models, and the results are given in odds ratio (OR). Having presented the analysis, chapter six discusses the results from the analysis structured by the three research questions. Lastly, chapter seven answers the overarching research question and highlights how this information can be used by policymakers.

## 2 Theory

### 2.1 The First Generation of Social Practice Theory: The Origins

Spaargaren (2011, p. 11) distinguishes between two generations of social practice theorists, where the first generation contains the likes of Bourdieu, Giddens, Foucault, Garfinkel, Butler and Latour (Reckwitz, 2002, p. 243). These theorists belong to different schools of thought but share similarities that warrants grouping them under the label of social practice theory. The first generation of thinkers were concerned with the question of actor-structure dualism that social sciences has been riddled with (Spaargaren, 2006, p. 14). In addition to bridging the gap between micro and macro levels, these theories prioritize daily routines as the central unit of analysis. Bourdieu and Giddens' theories studied these daily routines by accentuating the recursive relationship between actors and structures; recursive in the way that actors reproduce practices by adhering to the structural components in the shape of rules, values, norms, and so on, present in quotidian routines (Spaargaren, 2011, p. 815). Thus, individualistic accounts are avoided because these structures and rules are shared by actors, all the while a structural determinism is steered away from, due to actors being capable of inducing change.

Even though these theorists are grouped together in the same category, there were notable differences between a select few, that would later inspire the growth of a second generation of practice theory. Through his magnum opus – the theory of structuration – Giddens postulated that practices enabled theorizing that focus on the symbiosis between structure and agency, instead of divergence (Spaargaren, 2006, p. 13). At the time Giddens formulated his theory, Bruno Latour (1987) was working on his actor network theory (ANT) which would have a significant impact on Science and Technology Studies (STS) (Spaargaren & Oosterveer, 2010, p. 1897). This is important, because one of the criticisms later aimed at Giddens was that he neglected how technology and actors affected each other, especially when it came to processes of change. Latour's ANT also strays from individualistic theories, however he gives more importance to technological systems and sees agents as locked inside these systems (Spaargaren & Oosterveer, 2010, p. 1897). Consequently, ANT is labelled a technologically deterministic theory where actors are given less agency in comparison to Giddens' structuration theory.

The second generation of social practice theorists is comprised of Schatzki (2002), Reckwitz (2002), Warde (2005) and Shove (2012). Significant of this generation is a reinterpretation of social practice theory in a way that intertwines both aspects of Giddens and Latour's programs. By including technology as a central component of practices, the weak points of both Giddens and Latour's theories are counteracted. The agency of individuals related to Giddens structuration theory is kept intact, whilst also accounting for technology as an integral part of practices (Spaargaren & Oosterveer, 2010, p. 1898). With that said, the authors of the second generation differ in their approach when conceptualizing practices. This multitude of interpretations means there is not one correct approach for understanding social practices and it also highlights how this is a fledgling theory which still has room for innovation.

Below this, I will account for common features and points of distinction between theorists of the second generation. A short presentation of Reckwitz's (2002) article *Toward a*



*Theory of Social Practices* follows, as he provides a much cited definition and introduces materials as an integral part of social practices.

Although theorists use social practice theory differently, there are commonalities among them that warrants an eclectic approach. This is to say, using insight from one theorist does not rule out every other practice theorist. With this in mind, I have chosen to use Shove and Pantzar's (2012) tripartition of elements – materials, competences and meanings – in conjunction with Spaargaren's (2000) theoretical program. Spaargaren's theoretical program aims to study sustainable consumption by exploring the greening of practices.

## 2.2 The Second Generation of Social Practice Theory: Re-interpretations

Schatzki (2002) is seen as the initiator of the turn of practice that has taken place in recent times. Schatzki is indebted to Wittgenstein and Heidegger's philosophies (Buch, 2015, p. 116) as his understanding of practices and, more importantly, human intelligibility is more or less identical to the aforementioned philosophers (Nicolini, 2012, p. 163). This interpretation of human intelligibility states that humans respond to their current circumstances and consequently act in ways they deem appropriate to the situation. The concept of human intelligibility laid the foundation for many subsequent practice theorists, although the complexity of the concept is sometimes simplified (for example Shove and Pantzar (2012)) (Gram-Hanssen, 2010, p. 155). One practice theorist that followed up Schatzki's work was Reckwitz (2002). Reckwitz is largely seen as the first practice theorist to put emphasis on *things* (or materials and technologies) as an integral part of social practice theory. The inclusion of materials in social practice theory is now a foregone conclusion, as the vast majority of theorists' regard materials as essential. Schatzki is together with Reckwitz credited with creating the canon of social practice theory, which others since have developed further (Røpke, 2009, p. 2491).

In his article, *Toward a Theory of Social Practices* (2002, p. 245), Reckwitz builds on Schatzki's (2002) work on human intelligibility. The article starts off by juxtaposing social practice theory with purpose- and norm-oriented theories. Purpose-oriented theory claim individuals – referred to as *homo economicus* – act in a rational way based on self-interest, while norm-oriented theory propose that individuals – referred to as *homo sociologicus* – act according to internalized values and norms that exist outside the individual (Reckwitz, 2002, p. 245). Compared to these social theories, social practice theory places emphasis on symbolic structures of knowledge that enables agents to interpret their surroundings, that in turn enables them to act appropriately. These symbolic structures are social practices.

Reckwitz (2002, p. 244) defines a practice as:

A 'practice' (*Praktik*) is a routinized type of behaviour which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge. (Reckwitz, 2002, p. 249).

Although there are several definitions of what forms a practice, Reckwitz's definition of practices has become renowned because it compiles unifying elements from Bourdieu, Giddens, Foucault, Latour, Garfinkel, Taylor and Schatzki (Welch & Warde, 2014, p. 2). Thus, he touches upon the quintessence of a practice. Reckwitz states that practices are

entities constituted by a number of elements where each element is irreducible and thus creates a whole. These practices act as guidelines for how individuals act, and in turn individuals constantly recreate practices by acting in accordance with them. Furthermore, practices are *organized nexuses of actions*, which means that the doings and sayings of a practice are interlinked (Schatzki, 2002, p. 77). Organized sayings and doings can be thought of as actors performing a quotidian routine like taking the bus, but also being able to describe this action to outsiders.

Lastly, and Reckwitz's (2002) major contribution to practice theory, is that he gives *things* a prominent role. A vast majority of practices engage objects in the same way as they engage the individual. Objects render possible certain types of behavior and knowledge within the limits of a practice. As an example, public transportation as a practice requires infrastructure (for example buses, trains, way stations etcetera), but if the material quality is lacking this practice cannot challenge car-driving as a practice. On account of this, objects and materials are given equal status to subjects, meaning no composition of subject-object relationship (for example subject-subject) is given primacy (Reckwitz, 2002, p. 253). Furthermore, this signifies that the social is not necessarily dependent on inter-subjectivity, but the social could be situated in a practice with an isolated subject engaging an object. In giving objects the same status as subjects, Reckwitz disengages from Schatzki and provides a different interpretation of practice (Gram-Hanssen, 2010, p. 154). Consequently, social practice theory, as put forth by Reckwitz, challenges the notion of technological determinism because technology does not determine social relations or actions, but rather co-evolve with practices. Hence a change in technology prerequisites change in practices (Shove et al., 2012, p. 18).

## 2.3 Social practices: Entities and Performances

Reckwitz's (2002) definition of practice builds on Schatzki's (2002) proclamation that practices are duplex units. This bipartite understanding of practices, practice as entity and practice as performance, is used by each and all theorists of practice (Røpke, 2009, p. 2491). On the one hand, practice as entities can for example be commuting, cooking or industrial practices. An entity is something that people have the vocabulary to talk about and knowledge to understand, even if these individuals do not indulge in the practice themselves (Spurling, McMeekin, Shove, Southerton, & Welch, 2013, p. 20). In this sense, practice as entity is something that exists outside of the individual and which has a history and direction; practice as entity also necessitates shared meaning, knowledge, and knowhow amongst participants (see Shove and Pantzar's (2012) three elements that are accounted for later).

On the other hand, practice as performance is the observable actions of individuals. These single actions are part of practices as entity, such as buying a ticket for public transportation. Each time a practitioner buys a ticket there is always variation – for example practitioners can buy it by sending a text, through an app etcetera – both temporally and spatially, in how it is performed. With that said, these performances of practice take place due to practice as entities, that means that they do not stem from idiosyncrasy, but rather arise from meanings and knowledge attached to the practice (Spurling et al., 2013, p. 21). Consequently, inducing change in the performances of actors necessitates change in the entities. A change in entities could stem from a new influx of practitioners who perform the practice differently from status quo (Morley, 2016, p. 84). For instance, a material change – replacing the old fleet with a new one – in

public transportation could change how practitioners perform the practice, as the practitioners have to act in accordance with the new materials to perform the practice properly.

Since practitioners adhere to practice as entities and reproduce these entities through their performance, they are labelled *carriers* of practice. Carriers of practice refers to how practitioners are the ones who embody practices (Maller, 2016, p. 72). From here on out, individuals are referred to as practitioners or carriers of practice as “there are diverse social practices, and as every agent carries out a multitude of different social practices, the individual is the unique crossing point of practices, of bodily-mental routines” (Reckwitz, 2002, p. 256). As such, an individual is characterized by the practices they partake in.

As Reckwitz alludes to, a plethora of practices (entities) exist and this co-existence creates what Shove and Pantzar (2012, p. 62) name *bundles*. Bundles of practices are loose connections between practices that determines how one specific practice is performed. Furthermore, bundles of practices help distinguish how a practice evolve in a country, as a practice is affected by the historical trajectories of adjacent practices (Warde, 2005, p. 139). For instance, public transportation could be used by both male and female in one country, and predominantly by males in another country. This is a consequence of how other practices have co-evolved with public transportation in those countries.

## 2.4 The Elements of Social Practice

The second generation of practice theorists have a proclivity for crystallizing what the different elements of practices are. Gram-Hanssen’s (2010, p. 154) detailed overview of how different prominent theorists conceptualizes practices is presented in Table 1.

**Table 1 Overview of elements**

SHOVE & PANTZAR (2005)	WARDE (2005)	RECKWITZ (2002)	SCHATZKI (2002)
Competences	Understandings	Body	Practical understanding
		Mind	
		The agent	
		Structure/process	
	Procedures	Knowledge	Rules
Meanings	Engagement	Discourse/language	Teleo-affective structures
Products	Items of consumption	Things	

The gist of this table is that, even though these theorists label the constituent parts differently or include a varying number of components, they ultimately arrive at similar ideas of what a practice is. One anomaly is Schatzki’s omission of material objects (Spaargaren, 2006, p. 16). In Schatzki’s (2018) own words: “Some theorists of practice treat materiality as part of practices, whereas others believe that materiality is distinct from but intimately connected to practices” (p. 154). Although these theorists base their frameworks on philosophical and sociological theory – which makes their contributions unique – there is a propensity for eclecticism when applying social practice theory.

Davide Nicolini (2012), in his historical account of practice theory, writes that “adopting a cautious and reflective pluralist stance is perfectly legitimate as most practice theories share at least some common elements that allow them to be used in conjunction [...] an eclectic strategy allows us to provide a thicker account of the world we live in” (p. 213).

This thesis will not delve into the intricacies of the philosophical foundations, but will give precedence to sociological and empirical applicability (Røpke, 2009, p. 2491). I have thus chosen to use Shove and Pantzar’s (2012) tripartition of practices, in addition to utilizing insights from Reckwitz (2002), Schatzki (2002) and Warde (2005).

The argument for choosing Shove and Pantzar’s conceptualization is its accessibility. The elements are comprehensible and few in number and is the most commonly used perspective within consumption-based practice research. These elements, although few in number, covers the same elements that are proposed by other theorists. Shove and Pantzar (2012, p. 20) equip us with three elements: materials/products, competences and meanings, which comprises:

*Materials/products* – including things, technologies, tangible physical entities, and the stuff of which objects are made. This element builds upon Reckwitz’s detailed account on *things*, which has been thoroughly accounted for in previous paragraphs.

*Competences* – encompasses skill, know-how and technique. In comparison to Schatzki who proposes a distinction between explicit and implicit know-how (Gram-Hanssen, 2010, p. 155), Shove and Pantzar (2012, p. 30) elects to include all types of knowledge within this one category.

*Meanings* – consists of symbolic meanings, ideas and aspirations. This element has affinity to Schatzki’s concept of teleoaffective structures (2002, p. 80). Schatzki understands these structures as a connection between doings and sayings in practices. The teleoaffective structure is attached to a practice and it encompasses the goals that are sought-after in different practices, and the tasks that fulfill these goals. Furthermore, as indicated by the term teleoaffective, these structures carry a teleological and an affective component. Goals can have varied complexities when it comes to teleoaffective structures, as some might provide a stronger affective structure, whilst others a stronger teleological one.

## 2.5 Social Practice Theory and Sustainable Consumption

The new practice-based turn led by the second generation has seen social practice theory gain popularity in the field of sustainable consumption. When performing a practice, it is habitual to take advantage of materials required to perform the practice, which means practitioners consume those materials and, naturally, consumption impacts the climate. This in turn makes social practice theory a good fit with the field of sustainable consumption (Røpke, 2009, p. 2490). Warde (2005) is widely regarded as the first scholar to put forth a framework for understanding practices in the field of consumption, which has been welcomed as a competing perspective to models of individual choice (Welch & Warde, 2014, p. 3). Consumption has previously been interpreted as deliberate actions of the expressive or rational individual, but practice theory “emphasizes routine over actions, flow and sequence over discrete acts, dispositions over decisions, and practical consciousness over deliberation” (Welch & Warde, 2014, p. 3). Social practices thus give precedence to focus on the social aspect. For example, the act of driving your

child to school is understood as the use of a vehicle necessitated by the practice of commuting and not just purely as an act of consumption.

The merging of consumption and practice theory has birthed two different programs (Welch & Warde, 2014, p. 1). One program is connected to Elizabeth Shove (2012) and her foundation of a strict interpretation of social practices, whilst the other program – which this thesis complies with – is attributed to Spaargaren's (2000) practice theory rooted in ecological modernization. Both Shove and Spaargaren are heavily influenced by Giddens, though Welch and Warde (2014, p. 5) point out some differences between the two. Shove (2003) proclaims social practice theory should aim to chart the evolution of practices and how acts of consumption become habitual patterns. Spaargaren puts more emphasis on projects that focuses on sustainable consumption and on how practitioners actively try to obtain *sustainable lifestyles* (Welch & Warde, 2014, p. 5). Thus, Spaargaren introduces a program that accentuates active change in the form of projects, policymaking and consumers' capacity to promote sustainability, whereas Shove highlights the historical trajectories of practices as a tool to understand change within practices. Ultimately this means that the role given to individuals and the part they play in bringing about change in practices differ between the two programs.

## 2.6 Social Practice Theory: Spaargaren and Ecological Modernization

Shove (2012) and Spaargaren (2000) are presented as opposites, but it is important to clarify that it is their methods for investigating practices are at odds, not necessarily how they define practices. In contrast to Shove and Pantzar, Spaargaren does not launch his own interpretation of practice theories, but provides a novel way of utilizing the theory. Spaargaren (2000, p. 51) is mainly inspired by Giddens (1991) and his theory on *reflexive modernity*, and applies Giddens' thinking to the framework of ecological modernization. Therefore, I argue that using Shove and Pantzar's conceptualization of practices and applying it to Spaargaren's larger framework of ecological modernization is not contradictory but compatible due to the eclectic nature of social practice theory.

Based on ecological modernization, as a theoretical perspective, the significant points of Spaargaren's approach to practice theory is, first of all, related to how practitioners are essential for understanding changes in consumption patterns (Welch & Warde, 2014, p. 6). Secondly, the theory deviates from earlier ecological modernization dogma in the sense that the interaction between consumers and producers is thought to be of a dialectic relationship – for instance when designing a product – instead of the producer as the dominant party. Thirdly, Spaargaren (2010, p. 1898) takes direct inspiration from other practice theories – most notably Reckwitz (2002) – when he deems physical objects, materials and infrastructure related to a practice as a crucial element of practices.

To better understand Spaargaren's approach to social practice theory, it is thus necessary to give a brief description of his conception of ecological modernization, because the former is incorporated in the latter. Spaargaren gives a brief definition of what ecological modernization entails: "A sociological theory that has chosen the long-term transformation of western society as its object of analysis" (Spaargaren & Van Vliet, 2000, p. 56). This transformation is sought after against the backdrop of globalization and subsequent issues related to this phenomenon. Furthermore, ecological

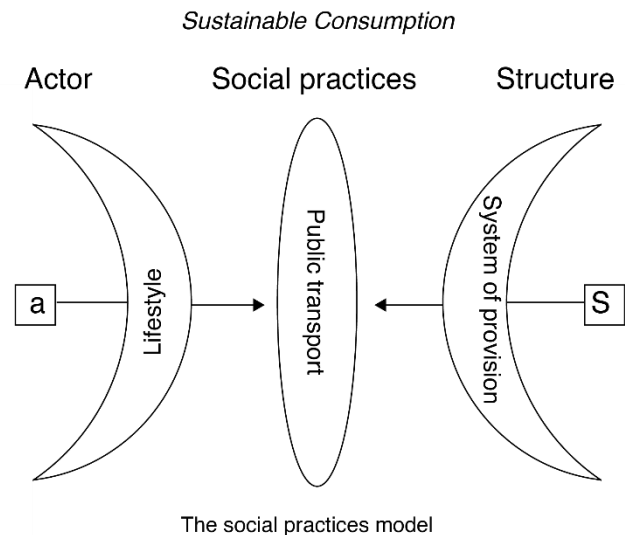
modernization is also a political program which proclaims that ecological indicators, in conjunction with cultural, economic and political indicators, amounts to independent criteria (Spaargaren & Van Vliet, 2000, p. 56). This means that institutions, organizations, and products and technology are evaluated based on ecological indicators in modern society. That being said, even though ecological indicators have to be acknowledged by actors and institutions alike, that does not mean that political or economic indicators are any less important (Spaargaren, 2000, p. 326).

A side effect of ecological criteria carrying more weight is an influx of green innovations that practitioners are confronted with daily (Spaargaren, 2006, p. 2). Previously, ecological modernization theory used to favor analysis of these environmentally friendly innovations from a production point-of-view; *upstream* processes. Upstream processes put a magnifying glass on distributors and producers and how they can offer green products to consumers (Spaargaren, 2011, p. 815). However, it is essential to account for the consumers and their lifestyles when aiming to make practices greener – which is labelled *downstream* processes. Spaargaren (2003) champions a downstream perspective where the *lifeworld* of practitioners is taken into consideration. It is important to account for practitioners because sustainable products and the consumption of these requires both producers and consumers. The result is that modern variations of ecological modernization places great emphasis on both innovations and the experiences of consumers.

Spaargaren (2011, p. 815) incorporates social practice theory in this modern interpretation of ecological modernization, which asserts that consumers and the greening of technology is pertinent. The main goal is then to transform practices into more sustainable ones by making reservations about the impact of technological innovations and practitioners' role in appropriating these new innovative ideas. Building upon this, Spaargaren (2011, p. 815) presents guidelines for choosing social practices of interest. Firstly, the practice at hand should be widely known to practitioners, implying that the practice has to be of interest for consumers and they should have a modicum of knowledge relating to the rules and structures of that practice. Secondly, the practice should to some degree have an impact on the environment (Spaargaren, 2011, p. 815). With this in mind, I have chosen to look at the practice of public transport, which is of interest for the consumers, because mobility is an essential part of everyday life. Furthermore, public transportation can also operate as a substitute for personal vehicles, which would reduce emissions considerably.

## 2.7 Spaargaren's Analytical Approach

Spaargaren's (2003) model of social practices, as depicted in Figure 2 below, visualizes how practices are situated in between *lifestyles* and *systems of provisions*; two analytical perspectives. An analysis of practices can take either perspective, and Spaargaren & Van Vliet (2011, p. 54) label the two approaches *analysis of strategic conduct* (left hand side) and *institutional analysis* (right hand side). This thesis – in accordance with a *downstream* perspective – focuses on the strategic conduct of consumers. A strategic conduct analysis does not lose sight of the structural components, but assumes that actors actively engage with these structures (Spaargaren & Van Vliet, 2000, p. 54). The main focus lies on knowledgeable agents and the way they lead their lives in relation to lifestyle and identity (Spaargaren, 2000, p. 328). One integral concept for conducting this type of research is lifestyle.



**Figure 2 Model of social practice theory**

### 2.7.1 Strategic Conduct Analysis: Sustainable Lifestyles

The concept lifestyle is in line with Spaargaren's (2003, p. 687) wish to bring sustainable consumption behavior to the fore, but in the context of practices. Lifestyle is a term derived from Anthony Giddens (1991), but was originally not included in his structuration theory; Spaargaren (2006, p. 19), however, has amalgamated lifestyle with practices. Lifestyle describes practitioners and how they create identities based on practices they partake in. This means that a bundle of practices that one individual is invoking is a means to understand this individual's identity and life-story (Spaargaren & Van Vliet, 2000, p. 55). The creation of a lifestyle is a reflexive process undertaken by actors (Axsen, TyreeHageman, & Lentz, 2012, p. 65), which is illustrative of how actors possess the ability to act freely, and not as a consequence of structural determination.

Spaargaren (2000, p. 56) revises the concept of lifestyle in such a way that it stays true to the project of ecological modernization. Practitioners are continuously exposed to green products and innovations that lead to these practitioners becoming environmentally conscious. In addition to the exposure of green products, practitioners and their actions are assessed in the light of ecological indicators. As a consequence of this, consumers are as inclined to act in ways that reduce environmental degradation as they are to act economically rational (Spaargaren & Van Vliet, 2000, p. 57). The revised concept is coined sustainable lifestyles, which depicts people who are made conscious of sustainability in the face of environmental degradation, and as such must reflect on different segments of their lifestyles. This is not to say that actors have to act sustainable, but between ecological, cultural, economic, and social capital, actors are made to create identities that best represent their capital-portfolio.

Sustainable lifestyle is closely knit to Shove and Pantzar's (2012, p. 30) concept of meanings. The fact that these meanings are located in practices means that individuals do not determine the value of a practice, but the values of practices stem from how one practice – in relation to other practices – is understood in the context of a standard life (Cass & Faulconbridge, 2016, p. 4). For example, the practice of public transportation is

thought to be an environmentally friendly mode of transport, but this is only because it is compared to the dominant practice of car-driving. Thus, a practitioner does not decide what a practice means for their identity; it depends on the meanings related to that practice. Therefore, when modelling a sustainable lifestyle, it is necessary to be a practitioner of a practice that has symbolic and social meanings that exudes being environmentally conscious.

### 2.7.2 Institutional Analysis: Systems of Provision

Although this thesis focuses on a strategic conduct analysis, the premise of social practice theory is to not lapse into distinctions between agency and structure. Therefore, it is necessary to briefly mention the right-hand side of the model. Systems of provision is affiliated with Fine and Leopold's work *The World of Consumption (1993)*, and the idea of provisional systems is to give insight into resources and rules pertaining to practices (Spaargaren, 2000, p. 329). Thus, a systems of provision perspective impedes a strictly individualistic account of practitioners and their lifestyles, and instead directs attention to how action is guided by socially shared rules and understanding.

Moving forward, this thesis will assume there are certain resources and rules related to the practice of public transportation that actors deal with. These resources and rules are represented by Shove and Pantzar's (2012) three elements.

## 2.8 Esping Andersen's Theory on Welfare Regimes

Spaargaren (2013, p. 236) clarifies that consumption practices are not identical, but that they vary depending on the country. This is because practices are naturally affected by the policies pertaining to a nation. This is further elucidated by social practice theory, since practice as entity describes shared meanings, skills, knowledge and materials pertaining to, for example, the practice of public transport (Spurling et al., 2013, p. 8). These shared meanings of what a practice signifies could be different in one country compared to another, which is also a consequence of the types of policies that are in place. Moreover, these variations arise due to how practices form loosely tied networks that constantly intersect each other. To understand how public transportation is a bundled practice, it is useful to add a complimentary theory that can help contextualize how practice as entities evolve and, moreover, one that helps illuminate the interplay between practices.

The introduction of *Three Worlds of Welfare Capitalism* by Gösta Esping-Andersen (1990) spawned a flood of studies dedicated to distinguishing different types of welfare regimes. This flood was triggered by virtue of welfare regimes being tasked with a crucial assignment, namely that of improving quality of life for its citizens. Thus, different welfare *ideal types* (see Weber (2005)) can portray cohesion between a group of countries and the way their societies function.

Upon presenting his ideal types of welfare regimes, Esping-Andersen was focused on the organization, social integration and stratification of varying welfare regimes (Arts & Gelissen, 2002, p. 139). Using these indicators as a framework, Esping-Andersen delineated three types of regimes: liberal; conservative and social democratic. These regimes encompass different countries that share similarities based on policies and political history. Esping-Andersen has received both praise and criticism for his ideal types. The praise has resulted in extensions and revisions of his welfare regimes, while the critique is directed at the ambiguity of these ideal types (Arts & Gelissen, 2002, p.



138). Although the criticism is valid, ideal types are exaggerated models of real-life phenomenon, and as such they are meant to be yardsticks for measuring reality.

Esping-Andersen (1990) only used 18 OECD countries when putting forth his ideal types, which have led to others jumping on the opportunity to expand his theoretical model, hoping to create ideal types for other parts of Europe, for example Eastern Europe (Fenger, 2007; Lauzadyte-Tutliene, Balezentis, & Goculenko, 2018). Even though much has been done in the aftermath of Esping-Andersen's work, few if any have gone about typifying welfare regimes for all the countries in the EU, in one exhaustive study. There have rather been a multitude of studies typifying different regimes in Europe, based on limited sample sizes of countries (Bonoli, 1997; Ferrera, 1996; Korpi & Palme, 1998). A consequence of this is that the literature on welfare regimes is plentiful but disjointed.

This thesis' point of departure is EU-28, plus Norway, Switzerland and Turkey. To allocate all 31 countries into different welfare regimes requires an eclectic approach, where I utilize information from various sources. My choice of dividing the 31 countries into six welfare regimes could suffer from research bias. However, in instances where the literature is disunited as to what welfare regime a country belongs to, I turned to Seeleib-Kaiser and Ferragina's (2011) meta-study of 23 papers on welfare regimes. Based on their study I incorporated countries that had an air of uncertainty about them into the regime they were most frequently connected with in the literature. In the upcoming section I will clarify my progress of placing the EU countries into six welfare regimes and describe characteristics pertaining to each regime.

### 2.8.1 Six Types of Regimes

Firstly, a *Nordic regime* consisting of Denmark, Finland, Norway and Sweden is included. These countries are recurrently grouped together in previous literature (Ferrera, 1996; Seeleib-Kaiser & Ferragina, 2011; Siaroff, 1994). The hallmark of this regime is the universal coverage of social benefits, meaning everyone is eligible to be beneficiaries. The universal benefits are crafted to uphold equality and an acceptable standard of living for all citizens (Lauzadyte-Tutliene et al., 2018, p. 102). These social policies require substantial funding, which is usually obtained through heavy taxation, which in turn makes it desirable to have a low rate of unemployment.

The second welfare regime is the *Mediterranean*, which is made up of Cyprus, Greece, Italy, Malta, Portugal, Spain and Turkey. One criticism of Esping-Andersen was that he failed to distinguish a Mediterranean regime and ever since, a plethora of research has established commonalities of Mediterranean countries that constitutes a welfare regime (Bonoli, 1997; Ferrera, 1996; Gal, 2010). The inclusion of the aforementioned countries is based on John Gal's proposal of a wider understanding of the Mediterranean welfare regime. Gal (2010) coins it "an extended family of Mediterranean welfare states" (p. 284). The Mediterranean welfare regime is characterized by low GDP per capita and low expenditure on social programs, and this leads to weak social support for the disadvantaged. With that said, their expenditures on social policies surpass that of Anglo-Saxon countries (Gal, 2010, p. 285). Additionally, the Mediterranean countries share similar historical backgrounds with regard to the evolution of industrialization and historical trajectories of political systems. Another unifying mark of these countries is that they share strong religious- and family ties (Gal, 2010, p. 291). Consequently, the welfare regimes in these countries cede some responsibility to religion and families, as these are central pillars of society.

Thirdly, the *Anglo-Saxon regime* is represented by Ireland and the United Kingdom (Esping-Andersen, 1990; Seeleib-Kaiser & Ferragina, 2011). One chief objective typical of this welfare regime is to boost employment rates to restrain destitution. Therefore, social policies are not meant to compensate for poverty, but are seen as a last resource (Soede, Vrooman, Ferraresi, & Segre, 2004, p. 25). Consequently, expenses used on social policies are low and often means-tested. Thus, this regime gives precedence to the market and citizens involvement in it.

Fourthly, the *Continental regime* constitutes Austria, Belgium, France, Germany, Luxembourg, the Netherlands and Switzerland (Ferrera, 1996). This regime is usually described by means-testing; means-testing provides insurance based on occupational status, which indicates that current or former employment is important for gaining access to social benefits (Soede et al., 2004, p. 25). Not unlike the Mediterranean regime, family and religious institutions are important contributors to society and they take pressure off the welfare state by performing welfare-related tasks.

Fifthly, the *Central European regime* consists of the Croatia, Czech Republic, Hungary Poland, Slovakia and Slovenia (Lauzadyte-Tutliene et al., 2018). The Central European model diverges from other welfare regimes when it comes to spending on social protection, due to expenditures being lower than the average of other EU-countries (Lauzadyte-Tutliene et al., 2018, p. 111). However, the Central European model share this characteristic of low spending on social protection with the Eastern European model accounted for below.

Sixthly, the *Eastern European regime* is composed of Bulgaria, Estonia, Latvia, Lithuania, and Romania. Both the Central- and Eastern European welfare regime is based on a study by Lauzadyte-Tutliene et al. (2018). This is because the literature covering the Eastern bloc is sparse and those who have studied Eastern forms of regimes generally include a smaller range of countries (Fenger, 2007; Soede et al., 2004). As mentioned, these countries have low expenditure on social policies as a consequence of their governments' bleak financial powers (Lauzadyte-Tutliene et al., 2018, p. 111). Lauzadyte-Tutliene et al. (2018, p. 112) conclude that the Eastern European regime is different from all the other typologies presented in previous research.

One reason for countries to cluster in various regimes is based on the historical trajectory of politics pertaining to each country. In research conducted on how political divide impacts social policies, it is indicated that left-wing parties are connected with developed welfare regimes and social policies, whereas right-wing factions are associated with less implementation of social policies (Aidukaite, 2009, p. 27). Another aspect that is crucial to welfare regimes – which also demonstrates the historical development of a welfare state – is social trust. Bjørnskov and Svendsen (2013, p. 282) emphasize the relevance of social trust when it comes to maintaining an extensive welfare state and everything that it entails; an extensive welfare state is upheld by transfers such as taxation, which helps pay for social policies. For example, people in Nordic countries are believed to endorse their respective welfare regimes because of the heavy taxation associated with said countries (Bjørnskov & Svendsen, 2013, p. 270). As a consequence of social trust, economic transactions are easier to carry through (NOU 2011: 7, p. 47). Thus, welfare regimes are molded by social trust and political partisanship, which in turn provide insight into historical trajectories that contextualizes present-day welfare regimes.

More recent studies have linked ecological modernization with types of welfare regimes (Dryzek, Hunold, Schlosberg, Downes, & Hernes, 2002). Diffusion of ecological modernization is used as a measurement to label varying regimes as eco-welfare regimes

(Zimmermann & Graziano, 2020); Dryzek (2003) states that social democratic welfare regimes are better equipped to implement environmental policies compared to liberal welfare regimes, because the former thinks ecologically directed policies are as important as economic ones. Koch (2014, p. 687) expands the research done by Dryzek and in a study of 30 countries – including countries from the Mediterranean and Eastern European welfare regime – confirms that countries with high GDP per capita cluster around characteristics such as high expenditure on social security, low levels of income inequality, high environmental taxation, but also large ecological footprints. Furthermore, Koch (2014, p. 696) refutes the idea of social democratic welfare regimes being disposed to environmental policies.

These clusters help distinguish between groups of welfare regimes that share some commonalities based on a plethora of indicators; indicators that are relevant when the dependent variable is measuring a hypothetical increase in taxes in return for an environmentally upgraded fleet of public transport. These clusters can draw attention to practices as bundles. For instance, voting on a referendum regarding a new fleet of public transportation cannot only be understood from the perspective of public transportation as a practice. Instead, practitioners are affected by their belonging to welfare regimes, as the history of these welfare regimes indirectly influence how they vote.

Lastly, the articles used as inspiration for the six welfare regimes constitute the literary background that I base my discussion on. Therefore, even if Esping-Andersen's theory is presented in this chapter, there will not be any further presentation of research done in this field in the following section. The next chapter is the literature review, and it provides an overview of research that uses social practice theory on sustainable transportation.

### 3 Literature Review

Having already established what theoretical perspective this thesis make use of, the literature review aims to give a detailed overview of social practice theoretical literature on sustainable transportation. In doing so, I discover a lack of quantitative studies and establish the need for more of these types of studies. Furthermore, the overview of social practice theoretical literature on transportation acts as a guideline in later stages of this thesis, for example, when constructing variables.

The chapter starts off by giving an introduction to the field of consumption. Thereafter, I give an account of dominant paradigms in the field of transportation. In the end, the overview of social practice theoretical literature on transportation is provided.

#### 3.1 The Field of Consumption: An Overview

The field of consumption has attracted attention from many disciplines because it is inextricably linked to the imminent environmental dangers facing our planet. These scientific disciplines seek to understand the underlying motivations of environmental behavior, but go about expounding this behavior differently (Spaargaren, 2013, p. 229). Spaargaren (2013, p. 230) posits that there have been two influential paradigms producing the lion’s share of research on sustainable consumption. These two paradigms are the individualist paradigm and the systemic paradigm. In the individualist paradigm individuals are understood to be rational actors that act out of self-interest; therefore, research aims to alter individual behavior. The systemic paradigm focuses on structures and how they affect actions of individuals, typified by a top down perspective on consumers. The distinctive features of both paradigms are listed in Table 2 (Spaargaren, 2013, p. 230). It is in response to the aforementioned paradigms that social practice theory has gained traction within the field of consumption, because neither the individual nor the structural elements are given precedence. However, social practice theory focuses on practices which encompasses both actors and structures in a symbiotic relationship.

**Table 2 Agency/structure**

INDIVIDUALIST PARADIGM (SOCIAL PSYCHOLOGY/ECONMICS)	SYSTEMIC PARADIGM (SOCIOLOGY/SCIENCE STUDIES)
<ul style="list-style-type: none"> <li>• Individuals and their attitudes are key units of analysis and policy</li> <li>• Behavior change of individuals is decisive for environmental change.</li> <li>• Individual choices are the key intervention targets (micro level)</li> <li>• End-users/consumers determine the fate of green products and ideas</li> <li>• Key policy instruments and approaches: social (soft) instruments (persuasion through information provision)</li> </ul>	<ul style="list-style-type: none"> <li>• Producers/states and their strategies are key units of analysis and policy</li> <li>• Technological innovation within the production sphere is decisive for change</li> <li>• Socio-technical systems are the key intervention targets (macro level)</li> <li>• Technologies and markets determine the fate of green products and ideas</li> <li>• Key policy instruments and approaches; the use of direct regulation targeting providers (laws, market-based interventions)</li> </ul>

Warde's (2005) article, *Consumption and Theories of Practice*, is a cornerstone in fusing practice theory with the field of consumption. Warde (2005, p. 137) understands the act of consumption as bilateral, meaning both market exchange – for example purchasing goods – and subsequent use of these goods as representative of consumption. This broad definition results in a close to inexhaustible field of research and Warde's pioneering work has resulted in an influx of practice focused research (Halkier, Katz-Gerro, & Martens, 2011). There is a wide range of studies and one influential contributor to the field is Elizabeth Shove and her colleagues. They are often referred to within consumption-studies due to their accessible formulation of practice theory, and they boast a wide collection of research, studying everything from the practice of Nordic walking (Shove & Pantzar, 2005) and showering (Hand, Shove, & Southerton, 2005) to practices of cleanliness and comfort (Shove, 2003). Other research includes food consumption (Fonte, 2013); energy consumption in households (Gram-Hanssen, 2010); pro-environmental attitude change (Hargreaves, 2011), and collective activity (Welch & Yates, 2018). Social practice theory has with this achieved a significant foothold in the area of consumption.

### 3.2 Soft Policies and Hard Measures in the Field of Transportation

As mentioned, the field of consumption is broad and consequently includes many subcategories; one such category being transportation. Transportation is consumptive in nature as it requires the use of some sort of vehicle, along with some form of access to it. Since much of the literature on transport is rooted in the field of consumption, the same individualist and systemic paradigms have dominated transport-literature. These paradigms are often used in policymaking and are generally referred to as soft and hard measures (Möser & Bamberg, 2008, p. 12). What follows is a short introduction to popular perspectives in both soft and hard measures.

Soft policy measures in the field of transportation studies are policies rooted in behavioral sciences. Soft measures try to persuade individuals to alter their behavior by drawing on psychological constructs such as values, norms and perceptions (Möser & Bamberg, 2008, p. 11). Two theories that are emblematic of soft measures are the Theory of Planned Behaviour (TPB) as presented by Ajzen (1991) and Schwartz's (1977) norm-activation (NAM) theory. TPB aims to explain intentionality of humans, while accounting for both social and personal factors. The model has, for example, been used to explain personal use of cars (Bamberg & Schmidt, 2001, 2003; Gardner & Abraham, 2008; Harland, Staats, & Wilke, 1999) and public transport (Bamberg, Ajzen, & Schmidt, 2003; Heath & Gifford, 2002). The theory of norm activation as formulated by Schwartz (1977) seeks to model pro-social behavior. An abbreviated version of the theory is that pro-social behavior is explained by personal norms within individuals. These individuals perceive certain events – for example emissions from driving cars – as threatening to others and act according to their personal beliefs in hope of avoiding the threatening consequences (Stern, 2000, p. 412).

In stark contrast to soft policy measures that actively try to engage consumers, hard policy measures are described as being conducted behind the backs of consumers, which implies that consumers have to adapt to changes in their environment (Spaargaren, 2013, p. 231). The hard policy measures look to implement physical infrastructural changes or other direct interventions – for example increase gas-prices – to reduce

emissions (Möser & Bamberg, 2008, p. 10). Research has been conducted on road closure (Fujii, Gärling, & Kitamura, 2001), congestion of roads with proposed remedies being congestion pricing (Stopher, 2004, p. 117) or transport pricing (Jones, 2003; Steg & Schuitema, 2007) and increased prices of car parking (Thøgersen, 2009). Additionally, Nelson and Mulley (2013) have researched infrastructural changes and user experiences after the implementation of a new public transportation system.

On the one hand, the studies rooted in behavioral sciences have been criticized for being too actor-centric, which leads to disregard of structural and material context; context that help shape actors' travel behavior (Heisserer & Rau, 2015, p. 582). More importantly, these soft measures fail to address changes at a higher level than individuals, for example institutional or societal change (Cairns, Harmer, Hopkin, & Skippon, 2014, p. 107). To remedy this lack of context, a social practice theory better enables research on transportation to account for cultural meanings, the social nature of actions and structural constraints related to using transport vehicles (Heisserer & Rau, 2015, p. 582). On the other hand, hard measures naturally fail to account for user-preferences and agency.

From a sociological standpoint, there are shortcomings related to the aforementioned paradigms; shortcomings described by Spaargaren (2013) as "sociologically naïve" (p. 232). Social practice theory provides a different path – a path paved between individualistic and systemic paradigms. When using social practices as a perspective on transportation it allows the exploration of individuals as autonomous agents, whilst accounting for other contextual factors in the form of rules, infrastructure and more, that shape a practice.

### 3.3 Social Practice Theory Applied on Transportation

The literature that is written about transportation by using social practice theory is sparse, and due to the versatile nature of practice theory, the application of it varies. With that in mind, I have chosen to include studies that use practice theory on any form of sustainable transportation, meaning any practice that can substitute cars. It is important to note that this is not an exhaustive literature review, but the main goal is to present central findings related to sustainable transportation practices. First off, I give a brief description of studies conducted in the field of transport.

Firstly, cycling as a social practice has sparked a bit of attention, especially in the United Kingdom (Aldred & Jungnickel, 2014; Spotswood, Chatterton, Tapp, & Williams, 2015) and a conference paper by Viladot (2018) looks at cycling in Quito, Ecuador. However, what the researchers aim to focus on, differs. Spotswood et al. (2015, p. 29) demonstrate how practice theory enables policymakers to promote cycling because charting a practice gives insight into unique connections between elements (for example between materials such as access to bicycles and meanings which could be safety concerns related to cycling). Aldred and Jungnickel (2014, p. 82) affirm that different areas of the United Kingdom, where cycling is either an up-and-coming practice or an established one, result in varying perceptions of cycling and its meanings. Viladot (2018, p. 413) seeks to infer whether cycling is a viable transport-option in Quito by accounting for barriers related to the constituents of cycling as a practice. In short, Viladot indicates that cycling will have a hard time breaking through, because it is thought to be unsafe and the infrastructure is not in place.

Secondly, there is a group of studies related to sustainable transportation as a practice (Iyanna, Bosangit, Lazell, & Carrigan, 2019; Kennedy, Krahn, & Krogman, 2013). Iyanna et al. (2019, p. 9) study United Arab Emirates as a case, and emphasizes the social barriers that prevent the adoption of more sustainable transport practices; the barriers are rooted in the meanings given to both public transport and private vehicles. On a different note, Kennedy, Krahn and Krogman (2013, p. 270) study the effect of infrastructure, resources and norms on sustainable transport in two neighborhoods in Canada. They conclude that which neighborhood one resides in has the biggest impact on the use of sustainable transport.

Lastly, a small number of articles have studied transport related issues. Cass and Faulconbridge (2016, p. 7) are engaged with modal shifts, meaning a change from car-based practices to any other practice that is more sustainable (for example bussing and cycling). They assert that policymakers need to account for materials, competences and meanings when hoping to recruit more people to use sustainable alternatives rather than private vehicles. In Norway, a study by Ryghaug and Toftaker (2014) delves into the practice of electric cars and how it differs from regular car use. Another article (Heisserer & Rau, 2015, p. 597) aims to re-conceptualize mobility practices to consumption of distance, to enable a broader understanding of what mobility entails. In yet another study on sustainable consumption practices, newly fledged parents were interviewed with the purpose of understanding what this transition meant for consumption-patterns within different practices (Jaeger-Erben & Offenberger, 2014, p. 170). With regard to transportation, parents experienced the car as incompatible with the needs of a new-born, which ultimately lead to a de-escalation of driving.

Since only a few of these studies refer to public transportation, it is necessary to provide an overview of which operationalization of practices these studies use (for example Shove's materials, competences and meanings etcetera) to clarify how one can go about operationalizing variables to measure similar concepts. Table 3 on the following page summarizes which practice the authors have studied, what methods they have applied, and the theoretical perspective they used. Lastly, the different findings of each author are summed up.

**Table 3 Summary of SPT literature**

AUTHORS	WHICH PRACTICE?	WHAT METHODOLOGY?	WHICH THEORETICAL PERSPECTIVE?	ELEMENTS OF PRACTICES
Aldred & Jungnickel (2014)	Cycling in four urban areas of the UK	Qualitative; interviews	Shove & Pantzar	<i>Meanings</i> vary based on the context of the area (distinguishing between emerging and established cycling areas). In established cycling areas, cycling as a practice is taken for granted but, people possess an abundance of competence and knowhow. For emerging areas, establishing <i>materials</i> , <i>competences</i> and <i>meanings</i> of cycling is troublesome for new practitioners.
Cass & Faulconbridge (2016)	Modal shifts to change from car-practice to more sustainable ones (e.g., cycling, walking or bussing)	Qualitative; longitudinal study	Shove & Pantzar	For bussing as a practice: <ul style="list-style-type: none"> <li>• <i>Materials</i>: busses, roads and bus-shelters.</li> <li>• <i>Competences</i>: reading of bus timetables, paying for ticket, being able to navigate between different routes to arrive timely.</li> <li>• <i>Meanings</i>: environmentally friendly and productive time (e.g., reading on the bus).</li> </ul>
Heisserer & Rau (2017)	Consumption of distance in four different situations (e.g., commuting within the city or from the Hinterlands) in Ireland	Qualitative; longitudinal interview	Schatzki	Social context and materials are co-dependent, for example, informants who were traveling from the Hinterlands often professed that using the car gave a feeling of freedom ( <i>teleoaffective structure</i> ), but they also had limited access to public transport infrastructure.
Iyanna, Bosangit, Lazell & Carrigan (2019)	Barriers to sustainable commuting (e.g., bussing) in UAE	Qualitative; interviews	Shove & Pantzar	Strictly focusing on Shove's concept of <i>meanings</i> , three types are distinguished. <ul style="list-style-type: none"> <li>• Socio-cultural <i>meanings</i>: public transport is considered low-status.</li> <li>• Symbolic <i>meanings</i>: feeling of freedom and independence when driving a car.</li> <li>• Personal <i>meanings</i>: convenience and comfort when driving a car.</li> </ul>
Jaeger-Erben & Offenberger (2014)	Sustainable consumption	Mixed methods	Shove & Pantzar	Parenthood results in an uptake of sustainable transport usage.
Kennedy, Krahn & Krogman (2013)	Sustainable transport in two Canadian neighborhoods	Mixed methods; OLS regression and interviews	Spaargaren & Southerton	<ul style="list-style-type: none"> <li>• Infrastructure affects appropriation of sustainable transport practices. Neighborhood is in this case understood as infrastructure.</li> <li>• Normative standards are adapted to car-use, but those who are engaged with other sustainable practices found that they could influence the normative framework by setting an example for others.</li> <li>• Resources in the form of capital-types (e.g., Bourdieu's capital types) is contingent on which neighborhood a person lives in.</li> <li>• Socio-demographic variables' – age, gender, household income and education – effect on sustainable transport is measured.</li> </ul>
Ryghaug & Toftaker (2014)	Electric cars in Norway	Qualitative; focus-group interviews	Shove & Pantzar	<ul style="list-style-type: none"> <li>• <i>Materials</i>: material qualities are related to the aesthetics of the electric cars, but also things like charging stations.</li> <li>• <i>Competences</i>: general knowledge about driving.</li> <li>• <i>Meanings</i>: driving an electric vehicle gave the interviewees a good feeling, and that feeling was amplified if the positive-feedback came from younger generations, as they are thought to be more environmentally concerned.</li> </ul>
Spotswood, Chatterton, Tapp & Williams (2015)	Cycling in the UK	Mixed methods; online survey and in-depth interview supplemented by focus-group interviews	Shove & Pantzar	<ul style="list-style-type: none"> <li>• <i>Materials</i>: access to bikes and bicycle paths.</li> <li>• <i>Competences</i>: general knowledge about cycling.</li> <li>• <i>Meanings</i>: cycling is thought to be practical, because it is timesaving and economical.</li> </ul>
Viladot (2017)	Cycling in Quito	Mixed methods	Shove & Pantzar	<ul style="list-style-type: none"> <li>• <i>Materials</i>: access to bikes and bicycle paths.</li> <li>• <i>Competences</i>: in Quito most limitations in competence is related to distances and fitness, because traveling time is usually lengthy.</li> <li>• <i>Meanings</i>: safety is seen as a hindrance for cycling, but other than that, it is seen as economical, ecological, healthy and nice.</li> </ul>



### 3.4 Qualitative is the Norm, but Quantitative is an Opportunity

Cass and Faulconbridge (2016, p. 4) observe that the largest portion of transport studies generally are quantitative, and that qualitative explorations are mostly used as preliminary studies to complement the quantitative part. Even though this might be the case for other theoretical fields, only a few social practice studies use quantitative methods (often in conjunction with qualitative approaches) to gather information on transportation (Iyanna et al., 2019, p. 8). This is apparent by the collection of articles presented, where the majority have employed qualitative methods and a minority has used mixed methods. For the most part, the quantitative contribution in these mixed studies is to highlight material usage, for example, how many percent of informants own a bike (Spotswood et al., 2015, p. 26; Viladot, 2018, p. 416), instead of performing regression analysis or other quantitative modelling techniques. The one study that performs a regression analysis is the paper written by Kennedy, Krahn & Krogman (2013).

One of the reasons for quantitative techniques lack of popularity is because it is hard to model practices, due to their labyrinthine compositions (Higginson, McKenna, Hargreaves, Chilvers, & Thomson, 2015, p. 952). Consequently, there are few and far between strictly quantitative research that uses social practice theory, although procedures for implementing quantitative techniques for the study of practices have been proposed or used. Network theory and cluster analysis has been recommended as possible techniques for modelling practices (Alison Leigh Browne, Pullinger, Medd, & Anderson, 2014; Higginson et al., 2015). However, the most common approach – which an iota of studies use – is time-series, due to their inherent capability of explaining changes in practices over time (Alison L. Browne, Medd, & Anderson, 2013; Warde, Cheng, Olsen, & Southerton, 2007). To my knowledge, no social practice theoretical papers have used multilevel analysis as a method to analyze practices, but other research fields such as economics and geography frequently use multilevel models to grasp phenomenon related to sustainable transportation (Santos, Maoh, Potoglou, & Brunn, 2013; Vanoutrive, 2015). This literature reveals how country-level factors such as GDP per capita, number of buses and population density have an impact on the use of public transportation (Santos et al., 2013, p. 134). Access to studies from other disciplines regarding which country-level indicators that have an effect on public transportation is useful, because they help clarify which level-two explanatory variables are relevant.

Ultimately, research using cross-sectional studies with quantitative techniques is sorely lacking from the field of social practice theory, and as Higginson et al. (2015) so succinctly put it: “Thinking critically about how one might model practices and experimenting with different approaches is in itself a valuable aim” (p. 952). This call to arms for more innovative quantitative designs of practices is absent in the literature using practice theory on transportation. To my knowledge, no research on transport practices has used methods beyond standard linear regression or plain descriptive statistics. These observations lay the foundation for the methodological approach of this thesis, which is multilevel analysis.

## 4 Methodology

This chapter starts off with presenting the ECHOES (2019) dataset and a subsequent evaluation of its quality. Thereafter, the variables extracted from ECHOES are accounted for. Following this, a theoretical and methodological reasoning for choosing a multilevel method is put forward, followed by some rudimentary principles of this method. To make sure the models are robust and unbiased, assumptions pertaining to logistic multilevel regression are accounted for and tested when possible. In situations where testing assumptions are outside the realm of possibility, potential weaknesses are discussed. Lastly, a review of how the dependent and independent variables are operationalized is presented.

### 4.1 The Vibrancy of ECHOES

This thesis uses the ECHOES international survey (Energy CHOICES supporting the Energy Union and the Set-Plan) (2019),<sup>1</sup> a EU backed project aiming to provide thorough insight into both collective and individual energy choices in 31 countries (EU-28 plus Norway, Switzerland and Turkey). From the 31 countries present in the dataset, roughly 600 respondents were recruited in each country, amounting to a total 18,037 respondents (Pons-Seres de Brauwer et al., 2019, p. 19). The project follows the premises of the European Strategic Energy Technology Plan (SET-Plan); a plan that promotes decarbonization of the EU. Other datasets exist that focus on either consumption or environmentally related questions, such as OECD Greening Household Behavior (2014), European Social Survey (2016), Eurobarometer (2016), Flashbarometer (2009), ISSP (2019), and European Perception of Climate Change (2016). Although these datasets offer valuable information on environmental issues, none are as up to date as ECHOES, nor are they as comprehensive or exclusively focused on environmental issues.

ECHOES is an interdisciplinary project where researchers from psychology, political science, social statistics, economics, and sociology worked side by side.<sup>2</sup> Energy-consumptive choices are looked at from three areas that permeates all research from ECHOES: smart energy technology, buildings and smart mobility (Pons-Seres de Brauwer et al., 2019, p. 12). To utilize the interdisciplinary team of researchers to its maximum potential, these three areas are studied from micro-, meso- and macro-levels. This novel multilevel perspective is labelled *energy collectives*, where the micro-segment describes individual choices influenced by collectives, the meso-segment describes the effect of culture and lifestyles on energy-related choices, and lastly, the macro-segment looks at formal units such as governments or nations and how they make energy-decisions (ECHOES-project, n.d.). The micro-segment is reflected in the questionnaire by an added layer, where respondents are placed in one out of three groups, namely municipality, country, or EU. A limited selection of questions in the survey are phrased in a way that reflects which group the respondent was placed in beforehand, for example whether you

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<sup>1</sup> The data that is used in this thesis is collected from ECHOES (2019) and ECHOES are not responsible for the analysis of the data or the interpretations that are made.

<sup>2</sup> <https://echoes-project.eu/>

would invest in photovoltaic rooftops if this was endorsed by either your municipality, your country or the EU. The following two paragraphs discuss the quality of the dataset.

#### 4.1.1 The Reliability of ECHOES

Reliability is a measure of data quality; reliability simply queries whether repeated measures, using identical research instruments, will result in similar outcomes (Ringdal, 2013, p. 96). One way to estimate reliability is to describe the consistency of surveys (or other forms of data collection methods). ECHOES (2019) collected their data through online questionnaires presented in the recipient's mother tongue and used random sampling, a method that hypothetically speaking makes it possible for anyone from a desired population to be drawn (Ringdal, 2013, p. 210). Alas, this is seldom possible, and because the questionnaire was done online it excludes people without access to internet. To make sure that no groups of people were underrepresented, a stratified selection was used. Stratified sampling divides the population into varying strata – based on sociodemographic indicators – and subsequently draws the sample from these strata. This ensures that groups are not underrepresented (Ringdal, 2013, p. 210). Consequently, indicators of age, income and gender, laid the basis for which the quotas were drawn from, to attain even representation of all demographics. Courtesy of Pons-Seres de Brauwer (2019, p. 15), the distribution of the samples are presented in Table 7 in the Appendix. The table shows us that the representativity in each stratum is close to the population mean.

The collection of data and the way ECHOES have gone about attaining respondents does not leave the impression that systematic measuring errors are likely to occur, but there will naturally be some non-systematic errors related to human error or similar (Ringdal, 2013, p. 97). With that said, secondary data – in this case ECHOES – does not always provide transparency on how they tackle reliability when carrying out these projects, which makes it close to impossible for an outsider to determine the survey's reliability. But, benefit of the doubt should be given to such an extensive and financially assisted project, because experienced data collectors were used and the sampling methods are robust (Klößner et al., 2017, p. 18).

#### 4.1.2 The Validity of ECHOES

A dependent variable and a handful of independent variables are chosen from ECHOES. The dependent variable asks whether respondents are willing to vote on a referendum where the premise is that, in exchange for higher taxes, an even more sustainable and new fleet of public transportation is implemented. The question is formulated as: "How would you vote on the referendum if you would be required to pay [randomly assign amount] more per month in taxes? You would have to pay this fee even if you never use public transport" (ECHOES, 2019). This randomly assigned amount varies based on national currencies. In Norway, for example, the range is from zero to a maximum of 200 NOK. The response alternatives were: "I would vote yes/no to support the new public transport system".

Previous research states a case for causal links between socio-demographic qualities and sustainable practices (Kennedy et al., 2013, p. 264). These characteristics are gender, age, education, household-income and children. With a basis in previous research, these socio-demographic variables are included as explanatory variables in the final model to chart characteristics of the practitioners who want a change in the practice of public transportation. In addition to the socio-demographic variables, a variable measuring the participant's outlook on welfare policies is included. This collection of variables is used to

describe carriers of public transportation practices, in addition to variables measuring materials, competences and meanings of public transportation.

With regard to validity, it is essential to call attention to the content validity of the variables measuring materials, competences and meanings. Skog (2015, p. 89) states that content validity is connected to how variables are operationalized and if the variables actually measure what they are intended to measure. The questions in ECHOES are not asked with a practice perspective in mind, considering ECHOES' main purpose is to look at energy choices from a plethora of research perspectives (Spotswood et al., 2015). Thus, it is hard to come by variables that accurately measure the concepts of materials, competences and meanings. For example, the variable pertaining to materials in my model asks how respondents perceive the infrastructure of public transportation in their vicinity (ranging from dissatisfied to satisfied). The idea is that their answers reveal how access to materials such as vehicles, bus-shelters, train-stations, and such is evaluated by the respondent. This is not what the variable directly measures, but it is implicitly stated. It is therefore paramount to keep in mind that these variables are in a sense exploratory, in that they indirectly touch upon matters related to materials, competences and meanings of public transportation.

## 4.2 Choosing Multilevel Analysis as a Model

Mixed models allow for level-two explanatory variables to be included, which offer a rare opportunity to further contextualize practices as entities, and similarly, to highlight how practices bundle together. This is essential when the aim is to characterize practitioners, because the exogenous structural factors of practices have to be accounted for. As such, the chapter continues by presenting the theoretical argument for the choice of multilevel model, subsequently followed up by a Hausman-test to determine the model's fit. To further solidify the choice of mixed model, a methodological argument is put forward.

### 4.2.1 My Theoretical Reasoning

The main reason for choosing multilevel analysis is based on insights from social practice theory. A multilevel analysis offers a unique opportunity to include variables situated at levels different from the usual individual level. Cross-sectional studies – like ECHOES – that only allow a snapshot of one point in time, are suboptimal when it comes to analyzing a practice as entity, because researching a practice as entity is believed to require tools for mapping temporal changes. Therefore, cross-sectional studies are better suited to detail how a practice carries on living, which is through practice as performance (Higginson et al., 2015, p. 953). Cross-sectional studies situated at the individual level can analyze practice as performance by giving insight into how a practice is performed and what affects this performance (Alison L. Browne et al., 2013, p. 30). However, when you add country-level variables into the mix, new ways of illuminating practice as entity arise. Country-level variables can help explain contextual factors within a country that discern how a practice is shaped historically. Furthermore, level-two variables allows for an analysis of interlinked practices and chains of interdependence (Shove et al., 2012, p. 66)

Hence, with the overarching research question being: *What characterizes consumers that want a material innovation in the practice of public transportation?* it is useful to provide insight into the unique country-related traits as these help describe why practitioners from one country would want to alter the practice of public transportation, whilst

someone from another country would be less intrigued. In conclusion, a multilevel analysis might be better suited to describe contextual nuances of practices as entities and linked practices, compared to a single-level analysis.

To verify whether the theoretical reason for choosing multilevel modelling holds up, a Hausman (1978) test was conducted. This test compares a consistent model against a more efficient model and the  $H_0$  maintains that the efficient estimator is in fact an efficient estimator (Stata Corporation, 2019a, p. 893). To clarify, in multilevel analysis it is possible to use what's called a fixed effects (FE) model or mixed effects model (RE). Mixed effects models are also known as random effect models – but going forward I will use mixed models (Mehmetoglu & Jakobsen, 2017, p. 199). The biggest difference between the two is that mixed models can include level-two explanatory variables, whereas fixed effects cannot (Bryan & Jenkins, 2016, p. 7).

The outcome of the Hausman test was -64.99, which falls outside the scope of the test, as the test statistic is chi-squared under  $H_0$  (Schreiber, 2008, p. 2). Schreiber (2008) notes that this is a common occurrence and that a negative test statistic might indicate that a fixed effects model is suitable. With that said, there is no conclusive literature on the field on how to interpret a negative outcome on the Hausman's test. Besides, both models – fixed effects and mixed model – are likely to produce minor variations in estimates due to the large number of level-one units within level-two units (Bryan & Jenkins, 2016, p. 8). When the number of level-one units – ECHOES has 18,037 observations at level-one and 31 at level-two – are that much higher than the level-two observations, mixed models will not be able to draw much information between countries, and the brunt of the explanation will instead be attributed within effects. Since fixed effects solely report within effects, Bryan and Jenkins (2016, p. 8) proclaim that there is little variation between the two and that a choice of model should follow focus of interest. Therefore, I have chosen to go for a mixed effects model, seeing as this approach fits with the theoretical premises of this thesis.

#### 4.2.2 My Methodological Reasoning

Another reason for choosing a multilevel analysis as the method of this thesis, is that it is capable of reinforcing the assumption of independent observations. In instances where data is rooted in individual observations, as is the case with ECHOES (2019), multilevel modelling is often deemed a superior approach, relative to single-level regression considering that it accounts for dependence of observations. To exemplify: individuals born within the same country could share characteristics and propensities that are not shared with people from other countries (Osborne, 2015, p. 3). In a single level regression, two respondents from the same country would be assumed to be independent, when in reality they might share some commonalities based on the hierarchical structure they are placed within. If this assumption is broken, standard errors could be too small, which in turn could give spuriously significant findings (Hox, 2010, p. 5).

For my dependent variable – a dichotomous variable asking if respondents would vote yes/no on a referendum – it is safe to assume that individuals belonging to one country are affected by culture, values and ideals pertaining to that specific country when voting. Thus, two persons originating from different countries could vote differently on the basis that the public transportation system or tax system is distinctive in their respective countries. Consequently, we are not dealing with independent observations.

### 4.3 Multilevel Models: An Introduction

In this section I provide a brief overview of some crude principles pertaining to multilevel models. Based on the previously stated theoretical and methodological motives, a mixed model is the method of choice for this thesis. To clarify what it is that distinguishes a mixed model from a fixed effects model, a short introduction is needed. The main difference lies in the mixed model's inclusion of a random effect in the form of an additional residual term.

$$y_{ij} = \beta_0 + \beta_1 x_{1ij} + \beta_2 z_j + (u_j + e_{ij})$$

The equation shown above visualizes how mixed models differ from their fixed effects counterpart and, consequently, from single-level regression. The fixed part of the mixed model is made up of the intercept  $\beta_0$ , and  $\beta_1$  are coefficients situated at the lowest level.  $x_{1ij}$  are characteristics of respondents (Bell & Jones, 2015, p. 4).  $\beta_2 z_j$  are coefficients and accompanying characteristics situated at the highest level. Now, the random effects are characterized by the last sequence of the equation.  $u_j$  is the higher-level residual term, that enables intercepts of different higher-level units to vary.  $e_{ij}$ , similarly, is the residual term for the lowest units (Bell & Jones, 2015, p. 4). In contrast with mixed models, fixed effects do not explain higher-level residuals, on the contrary, fixed effects aim to control for this variance by introducing dummy variables for the higher-level (Möhring, 2012, September, p. 6). The residual term depicting variance of higher-level entities can be thought of as between effects, as it enables us to calculate how much variance is found between higher-level units.

Mixed models have the potential to include random slope variance, meaning a lower-level variable can vary between clusters (Sommet & Morselli, 2017, p. 208). Consequently, instead of having a fixed coefficient report the general effect, the random slope lets us analyze how a variable change from one cluster to another. This is another unique feature of multilevel analysis, but it will not be explored any further in this thesis, seeing as random intercept slopes are not included.

### 4.4 Assessment of Multilevel Models

As with all regression models, there are assumptions that should be fulfilled to ensure that the models at hand are trustworthy (Mehmetoglu & Jakobsen, 2017, p. 134). First, a discussion around the number of level-two units, which could be a potential weakness, follows. Secondly, assumptions of logistic regression are presented and tested when possible.

#### 4.4.1 Number of Countries a Possible Challenge

This thesis employs a dichotomous outcome variable. The variable measures if respondents would vote yes or no on a referendum, which asks if the respondents would be willing to pay more taxes in return for a new, more sustainable, fleet of public transportation. As a result of the outcome variable being dichotomous, a logistic mixed model is advocated. This calls for some precaution, by virtue of multilevel models being estimated with maximum likelihood, which is the same parameter used for logistic modelling (Mehmetoglu & Jakobsen, 2017, p. 208). A consequence of this is that the computations become rather advanced, and the complexity increases with more units and variables.

On one hand, it is important to note that the number of observations at the secondary level – 31 in this case – can have implications when estimating coefficients on country-level variables. The literature is not unanimous on what number of secondary units is recommended, but it varies from ten to a hundred (Hox, 2010, p. 234). What is important to convey is that a low number of secondary observations could give smaller standard errors pertaining to both variance and fixed parameters (Bryan & Jenkins, 2016), and this is problematic because misleading standard errors makes it harder to produce significant results (Mehmetoglu & Jakobsen, 2017, p. 206). Additionally, it could have an effect on the level-two variables, as they become prone to showing downward bias (Bryan & Jenkins, 2016, p. 18). On the other hand, the individual parameters, meaning the fixed components of lower-level entities, should give unbiased results due to the large number of observations – as previously mentioned 18,037 – pertaining to this level.

With that said, Bryan and Jenkins (2016, p. 19) have performed Monte-Carlo simulations to determine what an adequate number of groups at the higher-level is, and they conclude: “To have full confidence in the results, researchers will probably want to use [...] 30 countries for non-linear models” (p. 20), whilst Schoeneberger (2015, p. 11) sets a satisfactory amount of level-two groups at 40. Again, this just goes to show that it is hard to set a concrete number on a satisfactory limit. Thus, the results presented in this thesis are deemed viable for interpretation, but it is important to bear in mind that a small sample size could mean a heightened risk of presenting type 1 errors pertaining to the estimates of level-two variables, because of smaller standard errors (Sommet & Morselli, 2017, p. 207).

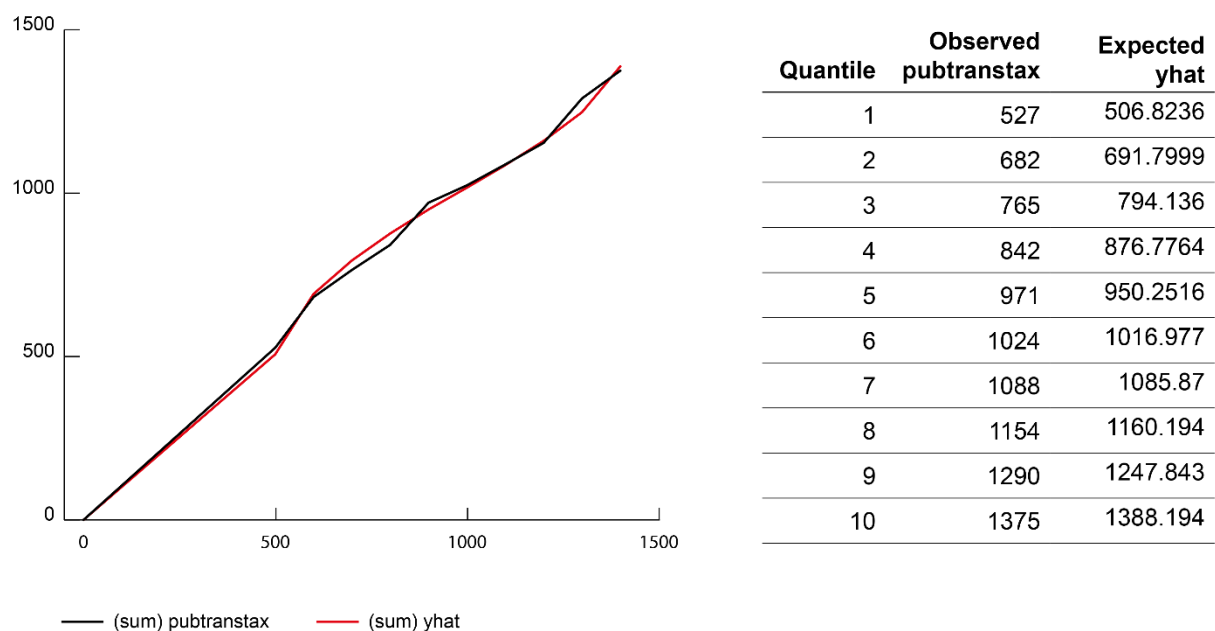
The number of secondary observations also determines the amount of country-level explanatory variables that can be included in the model. Mehmetoglu and Jakobson (2017, p. 206) present a rule of thumb that for every ten observations there is substantial grounds for including one level-two variable. Due to this mnemonic rule, I have included three level-two variables.

#### 4.4.2 Assumptions for the Model

The premise for conducting a logistic multilevel analysis is similar to that of basic logistic models. Generally, for logistic models, there are some assumptions that researchers should seek to satisfy, to create robust models that present unbiased results. Skog (2015, p. 380) presents three assumptions for logistic regression: (1) the model is specified correctly, meaning the variables can be described with a straight line using the logit-scale, (2) the residuals are independent, and (3) the independent variables are uncorrelated with the residuals.

To test the specification of the model, it is common practice to use Hosmer-Lemeshow’s (H-L) (1989) goodness-of-fit test. H-L tests if observed 0/1 values on the outcome variable matches the expected 0/1 values (Mehmetoglu & Jakobsen, 2017, p. 178). Unfortunately, this test is most suited for single-level models because it presupposes that observations are independent of each other, which is not the case for multilevel models where individuals are nested within units. There is literature that seeks to refurbish the test for multilevel models (Perera, Sooriyarachchi, & Wickramasuriya, 2016, p. 644), but the literature is sparse and unclear on how to approach a goodness-of-fit test when using Stata as software. Langer (2017) recommends using McKelvey & Zavoina’s Pseudo  $R^2$  as this is found to be the best measure of fit when compared to other  $R^2$  measures. With that said, I have used manual coding to imitate a goodness-of-fit test for my mixed

model. There are two ways of going about imitating the goodness-of-fit test with mixed models, which is to either only get predicted values for the fixed effects, or to predict values for both fixed and random effects (Statalist, 2017). I have chosen to include fixed and random effects by using the post-estimation command predict mu. Figure 3 shows the observed values from my model, plotted as a function against the predicted values (Statalist, 2018); on the right side is the table of observed and expected values for the outcome variable. Both the table and the graph tell us that there are small deviations, but nothing out of the ordinary. Thus, the H-L test informs us that the variables included in the model fits a specification criterion. With that said, due to the inclusion of the predicted random effects, the model cannot be generalized to other situations. It is important to note that the H-L test is an indicator that the variables in the model is not totally mis-specified, it is no panacea (Skog, 2015, p. 404). Therefore, the assumption of correct specification is first and foremost tied to strong theoretical grounds and one of the main focuses of this thesis is to let the theory of practice act as a guideline for the model (Mehmetoglu & Jakobsen, 2017, p. 178).



**Figure 3 Hosmer-Lemeshow test**

As for the assumption of independent observations, this problem has been ameliorated by using multilevel analysis. The last assumption regarding spurious correlations – meaning there exists an underlying variable that affects both Y and is correlated with X – is impossible to measure in Stata, but has to be assessed theoretically (Skog, 2015, p. 381). Thus, to stave off the negative effects of spurious correlations, the model is deeply rooted in social practice theory.

Mehmetoglu and Jakobsen (2017, p. 146) adds an additional assumption to the mix, which is absence of multicollinearity. Absence of multicollinearity indicates that other X variables can form a linear combination that shares the same explanatory power of another X variable. A VIF test was performed on the model, and the only variables having a higher score than five – a rule of thumb is that scores above five potentially means multicollinearity – were the quadratic and interaction terms (Mehmetoglu &



Jakobsen, 2017, p. 147). High values on these terms are to be expected and the bottom line is that the model does not suffer from multicollinearity.

## 4.5 Explaining Pubtranstax

In this section the operationalization of the dependent variable is explained, and for the sake of convenience it is labelled *Pubtranstax*. Additionally, the dependent variable's relevance for Spaargaren's theoretical program is discussed. Following this, the independent variables are explained. Table 4 gives a detailed overview of the descriptive statistics.

To make the interpretation of the dependent variable easier it was recoded as a dummy variable, with the reference category being *no*. Consequently, the outcome variable now shows whether respondents are grouped in category one, which is voting *yes*, or not (Skog, 2015, p. 313). The dependent variable touches on tenets of social practice theory and ecological modernization. Firstly, the second generation of social practice theorists place emphasis on materials and how they co-evolve with practitioners (Spaargaren, 2006). As pointed out earlier, the outcome variable foreshadows a material change. Furthermore, ecological modernization's *modus operandi* is to give credence to environmental protection and innovation, as a consequence of ecological indicators asserting their independence alongside other indicators (McGee, 2010, p. 430). The dependent variable showcases how sustainability should not only be understood through an economic frame of mind, but rather that it should be understood in conjunction with ecological indicators. Thus, the outcome variable is a good fit because the variable suggests a green innovation that aims to increase the costs of public transport, but also to reduce emissions. The sustainable aspect of the transport is deemed most important, and not the economic distress that might befall practitioners.

Not only does the variable catch the essence of ecological modernization, but it does so in a way that is fitting with key concepts from Spaargaren's (2006) program. The dependent variable describes the meeting point where the systems of provision – in this case the local government – meets the citizen-consumers and at this meeting point both parties can draw inspiration from each other (Thongplew, Spaargaren, & Van Koppen, 2014, p. 101). The meeting point also represents the agency that consumers are equipped with, because it is at these junctions that consumers choose which technologies they will adhere to. This is the crux of what the dependent variable is measuring, namely how consumers perceive the idea of a new public transportation system and if they are willing to invest in this idea. Lastly, the proposed referendum is indicative of lifestyle politics. In situations where practitioners are met with abrupt changes, in this instance a material change in the practice of public transportation, they are forced to reflect on the practice at hand and their own lifestyles (Spaargaren & Oosterveer, 2010, p. 1896). These lifestyles are the narratives practitioners put on display for others and, in the era of ecological modernization, sustainable lifestyles are put in the limelight.

The dependent variable is thus equipped to depict the ecological innovations that are common for ecological modernization, and at the same time provide a framework for social practice theory. This new public transport system is understood as a material change in the practice of public transportation. And given the fact that practitioners are the ones deciding if this material upgrade is materialized or not, they are given agency to decide if they want to appropriate this new material contribution. This is in line with Spaargaren's (2012, p. 8) perspective of individuals as agents of change, which he

proclaims have been sorely lacking from social practice research. With this in mind, this is not a dependent variable that measures the practice of public transportation explicitly – for example, a variable that measures how many times a respondent used public transport within a set time frame – but as stated, it visualizes a hypothetical innovation in this practice.

## 4.6 Explaining Independent Variables

The independent variables are anchored in previous social practice theory research on transportation, except for individuals' outlook on welfare policies, which is included in light of Esping-Andersen's (1990) welfare state theory. The presentation of the variables is structured in alignment with the three research questions and it starts with the socio-demographic variables describing the *carriers* of public transportation. Then we look at the variables drawn from Shove and Pantzar's (2012) three elements (materials, competences and meanings), which highlights public transportation as an entity. And lastly, the level-two explanatory variables are presented, and these variables focus on public transportation as a bundled practice. Table 4 below sums up the descriptive statistics of the operationalized variables.

Table 4 Descriptive statistics

	Mean	St. Dev	N
<b>1. Carriers of practice</b>			
Female dummy (1 = female (49.53%) 0 = male (50.67%))			18,029
Age dummy (0 = 55+)			18,037
18–34 (34.80%)			
35–44 (22.78%)			
45–54 (19.78%)			
55+ (22.65%)			
Education dummy (0 = University or college degree)			18,037
Elementary or secondary school (11.38%)			
Professional training (16.95%)			
A-Levels (21.67%)			
University or college degree (47.96%)			
Other (2.03%)			
Monthly income (0 = < than 1st quartile to 5 = > than 90th percentile)	3.275	1.836	18,037
Children 14 dummy (1 = no children (71.13%) 0 = one or more children under 14 (28.87%))			18,037
Welfare outlook (1 = left-wing to 5 = right-wing)	2.912	1.091	18,037
<b>2. Meaning</b>			
Lifestyle network (1 = strongly disagree to 16 = strongly agree)	9.487	3.069	18,037
Lifestyle reflexive (1 = strongly disagree to 5 = strongly agree)	3.747	0.997	18,037
<b>3. Materials</b>			
Infrastructure (0 = no public transit to 5 = very satisfied)	3.040	1.173	18,037
<b>4. Competence</b>			
Knowhow dummy (1 = use transit regularly (46.03%) 0 = don't use regularly (53.97%))			18,037
<b>5. Practice as bundles</b>			
GDPpercapita* (1 = 21.8 thousand \$ to 31 = 105.1 thousand \$ per capita)	42.563	17.600	18,037
Passenger km (1 = 8.9 passenger km to 31 = 30 passenger km)	18.151	5.112	18,037
Welfare regime dummy (0 = Nordic regime)			18,037
Nordic (13.38%)			
Mediterranean (19.50%)			
Anglo-Saxon (6.91%)			
Continental (23.45%)			
Central Europe (20.05%)			
Eastern Europe (16.71%)			

\*After log-transforming GDPpercapita: Mean = 3.680 St.Dev = 0.361

#### 4.6.1 Socio-demographic Characteristics

The first research question reads: *Who are the carriers of public transportation?* First off, it is paramount to note that these carriers of public transportation are carriers of other finite practices, and some might not even use public transportation, but I have chosen to label them as carriers of public transportation on account of these respondents having voted yes or no (0 = no) on a referendum regarding the practice of public transportation. The practitioners who are willing to vote yes are consequently assumed as carriers. Furthermore, although practitioners embody some sets of rules, meanings and use of materials pertaining to public transportation, this does not mean that this practice recruits a homogeneous group of people. Practitioners come in all shapes and forms and this is why it is important to include socio-demographic variables that chart characteristics related to the practitioners of public transportation.

*Female* originally included three categories: male, female and other. Out of the total 18,037 respondents only eight placed themselves in the category other. To make the interpretation of the gender variable easier, it was dummy coded, and the category other was deleted from the analysis. The final variable has male as reference category. The variable is relabeled *Female* and the inclusion of this variable is simply based on it often being included when measuring pro-environmental behavior (Kennedy et al., 2013, p.

264). Research rooted in psychological perspectives have found gender differences related to transport, but Kennedy et al. (2013, p. 264) find no significant correlation.

*Age* is in ECHOES (2019) operationalized as a categorical variable with four categories. The categories are as follows: 18–34; 35–44; 45–55 and 55+ (Ringdal, 2013, p. 91). Although the category 55+ could potentially have many respondents given its wide range, there is an even spread of observations between the categories. Age could be a determining factor when it comes to what respondents choose to answer on the referendum, as older people usually are not as environmentally conscious compared to younger generations (Kennedy et al., 2013, p. 264). This would imply that younger people are more likely to vote yes on the referendum compared to older generations. Thus, I have transformed the age variable to a dummy variable, with the reference category being 55+. Dummy coding a categorical variable allows us to see whether the different age groups have varying mean values on Y, ergo it allows for curvilinear relationships to be modelled (Skog, 2015, p. 316). The last-mentioned reasons for using dummy coding on categorical variables applies for every instance where it is used in this thesis.

*Education* consist of five categories: elementary or secondary school; professional training (practical skills); A-Levels (qualification for university); university or college degree; and other. There is room for concern regarding the content validity of this variable, because of the way it measures education (Skog, 2015, p. 89). Other classifications, for example the International Standard Classification of Education (UNESCO, n.d.), are vastly more complex and are better suited to account for national differences. Although only 367 respondents put themselves in the category other, the four remaining categories are wide-ranging which could lead to respondents with varying educational qualifications to be grouped together. In lack of a better alternative, the variable was dummy coded with higher education as reference category, the reason being that people with higher education are likely to dedicate themselves to pro-environmental routines (Kennedy et al., 2013, p. 264). To that end, respondents with higher education should be more likely to vote yes on the referendum

*Monthly income* is based on three different variables reflecting three different income levels in the survey. The three questions all begin with the same phrasing: “And is your household’s monthly net income less than [...]”, with the three response alternatives being: 1<sup>st</sup> quartile-income, 3<sup>rd</sup> quartile-income and 90<sup>th</sup> percentile-income (ECHOES, 2019). These quartiles account for country specific thresholds and are presented as such to the respondents. On each question, the respondents can either answer that they earn more or less than the quartile in question and if they answer “No, greater than that”, they can answer the next question with the same response alternatives, regarding a higher quartile. Building on these three questions I have constructed a new variable including all of them. By using extended generation with rowmax in Stata (2019b, p. 206), respondents are assigned the highest value for each observation. Thus, the new variable has five values ranging from having an income that is less than the 1<sup>st</sup> quartile – in the respondent’s country – to more than the 90<sup>th</sup> percentile.

A quadratic term was included to account for curvilinear effects (Mehmetoglu & Jakobsen, 2017, p. 137). Monthly income was found to have a convex curve and it is plausible that respondents with low wages are hesitant to vote yes on a proposition asking them to pay more taxes, while wealthier respondents might not think about the economic ramifications in the same way. To test whether the model with the quadratic term was a significant improvement on a model without the quadratic term, a likelihood ratio test

was performed. The likelihood-ratio test can be conducted on the fixed effects part of mixed models and effectively compare them (Gurka & Edwards, 2011, p. 154). The outcome of the test reveals that the unrestricted model – in this case the one with the quadratic monthly income term – with a significance value of 0.0005 is an improvement on the restricted model.

*Children 14* is made up of a variable asking how many children, under the age of 14, the respondents have. The variable ranges from zero to more than five children. This variable is an elongation of a former question that asks how many children the respondents have. 7,222 respondents reported that they do not have children, while some do have children but not under the age of 14. The total number of observations on children under the age of 14 variable is only 10,766. To remedy the missing values, *egen* with *rowtotal* was used (Acock, 2012, p. 61), meaning all missing values are set to value zero. Consequently, those who have children, but not under the age of 14, in addition to those who do not have children at all are all set to value 0. Lastly, the variable was dummy coded, of which the reference category is those without children under 14, whereas value one indicates those who have any number of children under the age of 14. Both Jaeger-Erben & Offenberger (2014) and Kennedy et al. (2013) come to a similar conclusion and they establish that having children in the home is positively associated with sustainable transportation.

*Welfare outlook* is a scale constructed from two variables, asking where respondents would place themselves on a left–right scale when it comes to social issues and economic issues. The response alternatives are left, center-left, center, center-right and right. The interaction between these two variables – the social and economic issues – gives insight into the respondents' view on welfare policies. To test the scale's reliability, Cronbach's alpha was used. Cronbach's alpha tests the scale at hand compared to a hypothetical scale that measures the same concept, in this case people's outlook on welfare policies (Skog, 2015, p. 97). The reported alpha-coefficient is 0.88, which indicates that this is a good measurement of the latent concept compared to other scales. Using Spearman's correlation, the variables showed a significant, strong and positive correlation. Lastly, a principal component factor analysis was conducted to see whether the two variables loaded onto one factor, and not more (Mehmetoglu & Jakobsen, 2017, p. 272). The factor analysis showed that both variables loaded onto one factor, which means that they give insight into the same phenomenon.

*Welfare outlook* is included as an amendment to the level-two variable based on Esping-Andersen's (1990) welfare regimes typology (accounted for later in this chapter). Political affinity is naturally going to play a role in voting on the referendum, but this affinity is affected by the historical foundation of the welfare regime a respondent belongs to. Two voters placing themselves on the same side of the left–right scale, but who hail from different welfare regimes, can have diverging perceptions of their public institutions when it comes to trust, willingness to pay taxes and such (NOU 2011: 7, 2011, p. 48).

## 4.6.2 On Materials, Competences and Meanings

### 4.6.2.1 Materials

In previous research, materials describe access to the specific vehicle required for the practice in question, for example bikes for cycling (Spotswood et al., 2015; Viladot, 2018) or buses and bus-shelters for bussing (Cass & Faulconbridge, 2016). In ECHOES there are no variables that explicitly measure materials or infrastructure; therefore, a more indirect approach is necessary. The variable chosen to highlight materiality of

public transportation is formulated as: "How satisfied are you with the current public transportation system in your area?". There are six response alternatives, ranging from "very dissatisfied" to "very satisfied", but the last value is "my area has no public transit". This last value was recoded to zero, meaning the new variable ranges from no public transportation in your close surroundings to being very satisfied.

This variable gives insight into how respondents feel about the infrastructure of the public transportation system in their area and it implicitly provides information about the materials involved, whilst simultaneously giving the opportunity to expound on where the respondents reside. There is substantial reason to believe that urban areas have superior access to public transportation compared to rural areas.

#### **4.6.2.2 Competences**

Again, it is hard to find variables that directly measure the practitioners' competence of public transportation, as this is an abstract concept. Thus, a scale was made out of variables measuring how many minutes a day the respondent rode bus, train, tram or underground (ECHOES, 2019). ECHOES have four separate variables for each means of transport, each one having six values ranging from 1-10 minutes a day, to more than 60 minutes a day. The last option is "I do not use the bus/train/tram/underground regularly". Constructing a scale of these makes sense as Cronbach's alpha gives an excellent score of 0.84 (Skog, 2015, p. 97), and Spearman's coefficient shows a strong positive correlation between the variables. The principal component factor analysis shows that the variables all load onto one factor. Furthermore, these variables are based on follow-up questions, and the preceding questions asked whether the respondents used bus/train/tram/underground or not. The respondents who said that they did not use any of these modes of transportation were not included in the variables the scale was constructed from. Hence, the total observations vary from variable to variable. In similar fashion to the variable *Children 14*, rowtotal was used to put all missing values to zero (Acock, 2012, p. 61).

Finally, the main variable was dummy coded, where value zero – the reference category – indicates "don't use regularly". This category consists of everyone who either reported that they do not use public transportation at all or do not use it regularly. Value one is "use regularly" and this category consists of respondents who use any number of public transportation daily – either bus, train, tram, underground or any combination of them. Thus, the variable *Knowhow* is meant to describe those who use public transportation daily and, as a consequence of frequent usage, has skills and knowledge related to the practice of public transportation.

#### **4.6.2.3 Meanings**

As Schatzki (2002, p. 83) points out, it is nearly impossible to draw up a complete list of teleoaffective structures (or meanings in Shove and Pantzar's (2012) words) pertaining to a practice, which is a consequence of the variety of practitioners performing the actions. Thus, the aim is to give insight into one symbolic meaning that belongs to the practice of public transportation, which is also apposite for ecological modernization's theoretical program and the concept of *sustainable lifestyle*.

Cass and Faulconbridge's (2016) study of mobility practices, in two cities in the United Kingdom, shows that informants think that one *symbolic* meaning of public transport is that it is environmentally friendly, mainly due to the informants believing public transportation to be a direct substitute for private vehicles. The understanding of public transport as environmentally friendly means that practitioners with a sustainable lifestyle

could see this mode of transportation as alluring. The value of public transportation being environmentally friendly is a shared social understanding that helps bring practitioners with similar lifestyles together (Spotswood et al., 2015, p. 24). Because of that, social networks play a part in the recruitment of practitioners. If a practitioner chooses to base her lifestyle on sustainable values, then it is probable that she has a social network where they share similar sentiments (Kennedy et al., 2013, p. 254).

The variable describing the meaning of public transportation as environmentally friendly is called *Lifestyle network*, because Spaargaren's (2000) concept of *sustainable lifestyle* is intertwined with the meaning-structure of public transport. To operationalize this variable, a scale of four variables was constructed. The substance of the variables is similar, in the sense that all of them asks whether the respondent deems it important what others think about their actions. For example, one variable is phrased: "Many people in [municipality, country or EU] would support it if I used less energy (for example using public transport)" (ECHOES, 2019). The other three variables ask whether others would support it if (1) "I favored energy policies", (2) "if I try to save energy", and lastly (3) "a growing number of people favor energy policies that support the energy transition". These variables all have five values, ranging from "strongly disagree" to "strongly agree". Consequently, the scale ranges from value zero to 16, where a value of 16 indicates respondents "strongly agree" that others support that person modelling a sustainable way of life. A potential stumbling block with these variables is that, as mentioned earlier, the respondents are placed into groups in advance – such as municipality, country or the EU. But to make sure there were no deviations amongst the groups, each level was tested on its own when creating the scale, and every scale provided the same results.

In similar fashion to the *Welfare outlook* variable, the scale's reliability and correlation was tested. Cronbach's alpha gives an excellent score of 0.77, which is satisfactory. Using Spearman's correlation, the variables showed a strong positive correlation. Lastly, a principal component factor showed the four variables loading onto one factor, meaning they give insight into the same phenomenon (Mehmetoglu & Jakobsen, 2017, p. 272). This scale was constructed to highlight how practitioners could wish to model a sustainable lifestyle, based on them seeking validation of their lifestyle from others. Thus, the variable focuses on social networks and how they help recruit practitioners with sustainable lifestyles to green practices.

Another variable, labelled *Lifestyle reflexive*, puts the focus on the reflexive individual who actively chooses to participate in a green practice such as public transportation. It posits the claim that "acting pro-environmentally is an important part of who I am" (ECHOES, 2019). The variable has five values and ranges from strongly disagree to strongly agree. Consequently, there are two variables meant to measure the concept of meaning and sustainable lifestyle, but each variable focuses on different perspectives: one on social networks and recruitment, and the other on reflexive individuals acting on their own accord.

#### 4.6.3 Explaining Country-Level Variables

To provide some wider context to practitioners' understanding of public transportation as a practice, three level-two explanatory variables were included in the model. These variables measure GDP per capita, total share of public transportation and type of welfare regime. The aim is for these variables to highlight how bundles of practices influence each other (Shove et al., 2012, p. 64). Thus, to understand the uniqueness

of public transportation in one country, these variables accentuate how practices form loose-knit patterns and, consequently, the way a practice takes shape in that country. So, even though GDP per capita cannot necessarily be thought of as a practice in itself, it permeates practices in the same way the circadian rhythm affects life at hospitals:

a medical procedure depends, in part, on the patient's condition, but it also depends on patterns of shift-work, the day of the week and the time of the year, all of which are relevant for the scheduling and coordination of parallel practices. (Shove et al., 2012, p. 65)

The variables were created using country-level statistics from The World Factbook (CIA, 2020b) and Eurostat (2020b). The data obtained from these sources were all from 2017, two years prior to ECHOES' (2019) release; the year the statistics are reported is relevant due to causality (Mehmetoglu & Jakobsen, 2017, p. 206).

#### **4.6.3.1 Gross Domestic Product per Capita**

GDP is the total monetary value of all services and goods produced in a country during the timespan of one year; to obtain per capita, GDP is divided by the average population. GDP per capita is often used as a measure of a country's social welfare and living standards. Although questions have been raised about GDP's accuracy as an indicator of the aforementioned qualities (Fleurbaey, 2009, p. 1029), it is still a frequently used indicator for both politicians and institutions alike (Bergh, 2009, p. 120). A repertoire of indicators has been found to correlate with GDP, namely well-being, mortality rates for infants, literacy and even civil and political liberties (Bergh, 2009, p. 122). Thus, GDP operates as a simplified measurement of living conditions in countries, and GDP has been found to have a positive impact on use of public transportation in cities (Santos et al., 2013, p. 134).

Constructing *lnGDP* (*ln* refers to the log-transformation) was done with information from CIA's World Fact Book (2020a), using numbers from 2017 for each country. The total monetary value is conveyed using dollars as unit of measure. Usually, when operating with GDP variables, it is meaningful to examine the variable to assure that it does not suffer from anomalous skewness or kurtosis measures (Mehmetoglu & Jakobsen, 2017, p. 326). If the variable is not normally distributed it can affect statistical generalization. The GDP per capita variable used in this thesis has a skewness of 1.66 and a kurtosis sitting at 6.22. The skewness does not deviate much from the wanted score of 0, but the kurtosis is way higher than the desired 3. Using *qgladder* in Stata reveals that the transformation that is closest to making GDP per capita into a normally distributed variable is log-transformation. Consequently, the variable was log-transformed and now has a skewness score of 0.62 and a kurtosis score of 3.04, which is all but a normally distributed variable.

#### **4.6.3.2 Share of Public Transportation**

A variable on share of public transportation – labelled *Passenger km* – was constructed using data from Eurostat (2020c) and it measures the percentage of public transport out of the total of inland transport. All the numbers are from 2017 for each country. Eurostat understands public transport as buses and trains. Although trams and undergrounds are not included due to a lack of data, trains and buses still represent major modes of transportation within all of the countries. With that said, it is important to note that public transportation as a practice – as understood in this thesis – encompasses trains, buses, trams and undergrounds, meaning the variable does not give a complete overview.



Total inland transport is regarded as all movement within nations by passenger cars, buses, coaches and trains (Eurostat, 2020c). The unit of measurement is passenger-kilometer, where one passenger-kilometer equals a passenger travelling one kilometer. Thus, the variable uses passenger-kilometer to measure the share of public transport of total inland transport. This variable helps provide insight into access to public transportation and sustainable infrastructure in different countries (Eurostat, n.d.). Consequently, it alludes to how countries deal with transportation and whether sustainable options, in the form of public travel, is given importance. Previous research states that the number of vehicles in public transportation, such as buses, correlates positively with the use of public transportation (Santos et al., 2013, p. 134).

#### **4.6.3.3 The Six Types of Welfare Regimes**

The final level-two explanatory variable – labelled *Welfare regime* – is based on the clusters deriving from Esping-Andersen's (1990) theory of welfare regimes. That means the 31 countries included in ECHOES (2019) are divided into six clusters, each representing a different type of welfare regime; these clusters being the Nordic, Mediterranean, Anglo-Saxon, Continental, Central European and Eastern European regimes. Furthermore, the variable was dummy coded using the Nordic regime as reference category; choosing the Nordic welfare ideal type as a reference category is done because these countries have strong social welfare and universal coverage, which set them apart from the other welfare regimes.

This variable was included in a cross-level interaction term with *Welfare outlook*. Both variables are included based on research on welfare regimes, and it makes sense to create an interaction term between the two. Depending on the welfare regime, it is probable that the majority of respondents within a cluster will have views that align with how their national welfare state shapes their economic and social policies (Aidukaite, 2009, p. 27). Consequently, the effect of outlook on welfare policies is affected by which country the respondent belongs to, due to countries belonging to a certain type of welfare regime. The inclusion of the interaction term was tested with a likelihood-ratio test and a significant outcome tells us the unrestricted model fits the data better.

## **4.7 Exploring the Possibilities**

The overall quality of the model that ensued from these variables is expected to be robust. The quality of ECHOES (2019) – which stems from a team of professionals creating the questionnaire and experienced data collectors carrying out the survey – results in a reliable and valid foundation. With regard to the number of country-level units, although there are only 31 countries included in the survey this should not cause downward bias of the results from the level-two explanatory variables. On the same note, the fixed effects of the level-one explanatory variables are expected to report unbiased effects. Furthermore, according to the manually performed goodness-of-fit test, the variables fit the logistic distribution of the outcome variable. With that said, testing the model's fit has been a challenge as some of the techniques for doing so is beyond the scope of my knowledge and other tests are incompatible with multilevel models in Stata.

It is important to note that my role as a researcher could be affected by me having a preconceived notion when I embarked on this thesis; a presumption of wanting to connect social practice theory with quantitative modelling. This could potentially lead to variables being forced to fit a theoretical paradigm that is ontologically at odds with

individuals as analytical units (Shove et al., 2012, p. 115). The ontological incompatibility is due to the variables in ECHOES not using practices as analytical units, but rather individuals. Thus, to circumvent this ontological barrier, I have used individual observations as an indicator of how structural components – for example materials – affect *how* the individual answer. It is not the rational individual that plots in answers on the ECHOES questionnaire, it is the practitioner who is a *carrier* of finite practices. Thus, their experienced reality is that of practitioners. As Creswell describes it (2014, p. 86), a theoretical perspective can be thought of as a rainbow that connects the outcome variable with the independent variables. This has been my main goal, to use the theoretical perspective of social practice theory to make sense of variables rooted in individual observations in a cross-sectional study.

All in all, questioning the validity of some variables included in the model is justified. This in turn complicates upholding a post-positivistic view. Post-positivists value highly the search for causal relationships, to determine causes of social phenomena (Creswell, 2014, p. 36). However, in the words of Browne et al. (2014), when reflecting on the use of quantitative methods in conjunction with social practice theory: “Although it may require more vigilance maintaining a post-positivist approach while using quantitative methodology, it is possible to use it in a way that enables description rather than causation” (p. 29). Pursuing this expressed opinion, I think a cautious approach to statistical generalization is in order. Instead of thinking of the results as generalizable to the population of the EU, a *moderatum* approach could be more fruitful. A moderatum approach focuses on how generalizations can be made about the social world, and one way of establishing moderatum generalization is based on theoretical inference (Williams, 2000, p. 218). Theoretical inference aims to infer what regulates social behavior and creates shared social meaning by studying ideal types. I argue that interpreting the variables through the perspective of social practice theory enables me to inspect how practices regulate the behavior of individuals in the EU. Hence, if the practice of public transportation is thought of as an ideal type and I establish characteristics pertaining to this practice and how it affects practitioners of EU, then it is reason to believe this could be done with any other practice.

With all of this said, the methodology in this thesis is qualified for answering the main thesis question. Different aspects of public transportation as a practice are covered by the variables and their subsequent effect on practitioners voting on a new public transportation system. The next chapter presents the analysis of the full regression model which is based on the variables presented in the present chapter.

## 5 Results

This chapter presents the results of the multilevel models that were constructed by using the variables operationalized in the previous methodology chapter. The results will be presented using odds ratio (OR), but both logit and OR are included in the regression table (see Table 6). Accordingly, interpreting OR is done by utilizing the formula  $100 \cdot (OR - 1)$ , which gives us percentual changes in odds (Ringdal, 2013, p. 439). Furthermore, the odds ratio presented in the analysis are calculated from the exponentiated coefficients in model five, which is the complete model. The critical value for significance level is set to 5%.

The results will be presented stepwise, starting off with an intercept-only model. Thereafter, using the three research questions as a guideline, the rest of the variables are included. Determining whether the model improves in explaining the outcome variable by adding independent variables stepwise is an arbitrary task, due to the complexity of logistic multilevel regressions, but in cases where independent variables have confounding effect on each other, this is discussed. Finally, intraclass correlation (ICC) is reported for each model to determine whether the amount of variance between countries diminishes.

### 5.1 Introducing the Intercept-only Model

Following advice from Hox (2010, p. 56), a bottom-up procedure was used to convey the results from the models. A bottom-up procedure starts from the ground up, in a way that parameters are incrementally added to the model. It is common practice to first introduce an intercept-only model, which is a base model only containing the intercept without any explanatory variables (Hox, 2010, p. 56). The equation for the intercept-only model is as follows:

$$Y_{ij} = Y_{00} + u_{0j} + e_{ij}$$

This equation includes the intercept and the residuals at individual level  $e_{ij}$  and at the group level  $u_{0j}$ . Using the group level and individual residuals allows us to calculate ICC. ICC measures how much variance in the outcome variable is attributed to the second level, which in this case is countries (Mehmetoglu & Jakobsen, 2017, p. 203). A criterion for ICC is that if it is over five percent it should not be ignored, and consequently, if it is lower than five, one might contemplate using a single level model.

The intercept-only model – shown in Table 5 – displays the variance component for countries and using these components to calculate the ICC gives us a score of 0.021. To calculate the ICC, Stata uses the formula  $VPC = \frac{var(u_0)}{var(e) + var(u_0)}$ , where  $var(u_0)$  is the level-two variance, which in this intercept-only model is 0.0713.  $var(e)$  is the level one variance (Mehmetoglu & Jakobsen, 2017, p. 203).

**Table 5 Intercept-only model**

Intercept-only model pubtranstax		
Pubtranstax	B	S.E.
_cons	0.158**	(0.0504)
var(_cons~)	0.0713***	(0.0200)
N	18037	

Standard errors in parentheses  
\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

This shows that around two percent of the variance in Y is attributed to between variation amongst countries, hence most of the variance is to be found within individuals (Hox, 2010, p. 15). With regard to the rule of thumb that ICC *should* be higher than five, although the variance in the outcome variable amounts to two percent, it is still variance between countries that can be accounted for. For theoretical reasons mentioned earlier, a multilevel method is still used.

## 5.2 The Models Step-by-step

**Table 6 Multilevel regression models**

Pubtranstax	Model 1 Carriers of practice			Model 2 Meaning			Model 3 Materials			Model 4 Competence			Model 5 Practice as bundles			
	B	S.E. <sup>1)</sup>	Exp (B)	B	S.E. <sup>1)</sup>	Exp (B)	B	S.E. <sup>1)</sup>	Exp (B)	B	S.E. <sup>1)</sup>	Exp (B)	B	S.E. <sup>1)</sup>	Exp (B)	
Female	-0.00636	(0.0306)	0.994	-0.0511	(0.0299)	0.950	-0.0452	(0.0302)	0.956	-0.0452	(0.0302)	0.956	-0.0478	(0.0302)	0.953	
Age (ref.: 55 +)																
18–34	0.111**	(0.0477)	1.118**	0.219***	(0.0545)	1.245***	0.210***	(0.0541)	1.234***	0.174***	(0.0525)	1.190***	0.157***	(0.0518)	1.170***	
35–44	0.0677	(0.0530)	1.070	0.148**	(0.0588)	1.160**	0.149**	(0.0589)	1.161**	0.138**	(0.0584)	1.148**	0.124*	(0.0577)	1.132*	
45–54	0.0134	(0.0482)	1.014	0.0506	(0.0510)	1.052	0.0569	(0.0515)	1.059	0.0522	(0.0514)	1.054	0.0384	(0.0508)	1.039	
Education level (ref.: University or college degree)																
Elementary or secondary school	-0.356***	(0.0369)	0.701***	-0.271***	(0.0410)	0.763***	-0.275***	(0.0409)	0.759***	-0.259***	(0.0417)	0.772***	-0.261***	(0.0416)	0.771***	
Professional training	-0.445***	(0.0295)	0.641***	-0.394***	(0.0317)	0.674***	-0.392***	(0.0318)	0.676***	-0.375***	(0.0325)	0.687***	-0.369***	(0.0328)	0.691***	
A-Levels	-0.177***	(0.0345)	0.838***	-0.128**	(0.0370)	0.880**	-0.131**	(0.0370)	0.877**	-0.132**	(0.0370)	0.876**	-0.130**	(0.0372)	0.878**	
Other	-0.175	(0.0919)	0.839	-0.112	(0.0998)	0.894	-0.105	(0.101)	0.900	-0.0860	(0.103)	0.918	-0.0789	(0.104)	0.924	
Monthly income	-0.0988*	(0.0361)	0.906*	-0.0984*	(0.0369)	0.906*	-0.0971*	(0.0370)	0.908*	-0.0877*	(0.0374)	0.916*	-0.0808*	(0.0378)	0.922*	
Children 14	-0.000866	(0.0373)	0.999	-0.0201	(0.0373)	0.980	-0.0181	(0.0374)	0.982	-0.00733	(0.0380)	0.993	-0.00421	(0.0381)	0.996	
Welfare outlook	-0.153***	(0.0122)	0.858***	-0.128***	(0.0128)	0.880***	-0.129***	(0.0128)	0.879***	-0.125***	(0.0129)	0.882***	-0.241***	(0.0277)	0.786***	
Monthly income x Monthly income	0.0274***	(0.00717)	1.028***	0.0288***	(0.00731)	1.027***	0.0265***	(0.00733)	1.027***	0.0258***	(0.00734)	1.026***	0.0251***	(0.00736)	1.025***	
Lifestyle network				0.0789***	(0.00600)	1.082***	0.0737***	(0.00601)	1.076***	0.0709***	(0.00602)	1.073***	0.0695***	(0.00601)	1.072***	
Lifestyle reflexive				0.279***	(0.0232)	1.322***	0.279***	(0.0233)	1.322***	0.273***	(0.0232)	1.314***	0.271***	(0.0232)	1.311***	
Infrastructure							0.111***	(0.0153)	1.118***	0.0887***	(0.0153)	1.093***	0.0864***	(0.0153)	1.090***	
Knowhow										0.321***	(0.0454)	1.378***	0.324***	(0.0456)	1.383***	
lnGDP													0.400*	(0.263)	1.491*	
Passenger km													0.0202**	(0.00776)	1.020**	
Welfare regime (ref.: Nordic)																
Mediterranean														-0.615**	(0.108)	0.540**
Anglo-Saxon														-0.270	(0.199)	0.763
Continental														-0.658***	(0.0951)	0.518***
Central Europe														-1.210***	(0.0645)	0.298***
Eastern Europe														-0.919***	(0.0928)	0.399***
Interaction of welfare outlook in welfare regimes. Welfare regime (ref.: Nordic)																
Mediterranean x Welfare outlook														0.116*	(0.0529)	1.123*
Anglo-Saxon x Welfare outlook														-0.0443	(0.0693)	0.957
Continental x Welfare outlook														0.0441	(0.0495)	1.045
Central Europe x Welfare outlook														0.250***	(0.0628)	1.283***
Eastern Europe x Welfare outlook														0.236***	(0.0646)	1.266***
_cons	0.646***	(0.165)	1.907***	-1.277***	(0.0323)	0.279***	-1.563***	(0.0255)	0.210***	-1.612***	(0.0243)	0.200***	-2.757***	(0.0471)	0.0635***	
var_cons [country_sample]	0.0716***	(0.0216)	1.074***	0.0710***	(0.0216)	1.074***	0.0719***	(0.0219)	1.075***	0.0691***	(0.0211)	1.072***	0.0281**	(0.00963)	1.028**	
N			18029			18029			18029			18029			18029	

<sup>1)</sup> The standard errors reported in the table are obtained from odds ratio, not logit.  
\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

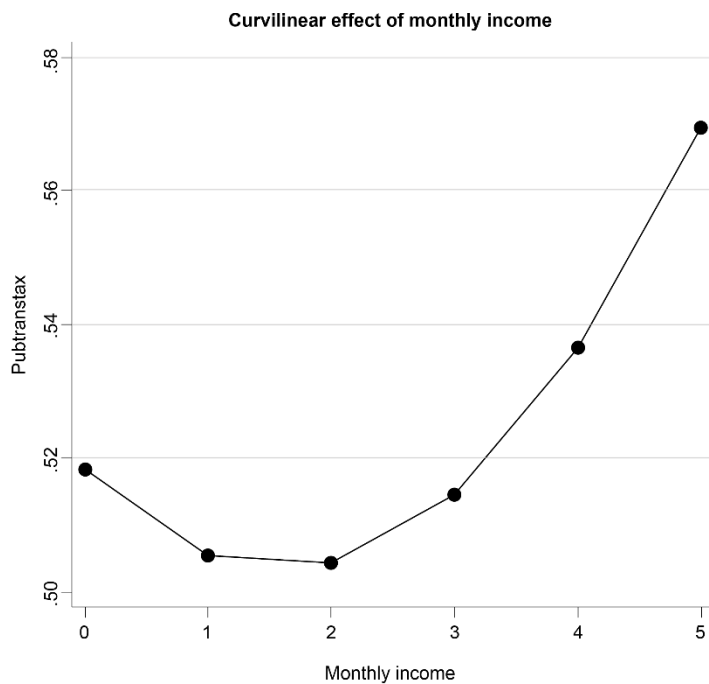
### 5.2.1 The Socio-demographics of Carriers

The first research question asks: *Who are the carriers of public transportation?* This research question is examined in the first model labelled *Carriers of practice*. Hence, the analysis starts with the socio-demographics for carriers of public transport as a practice. Table 6 shows that model 1 consists of the variables *Female*, *Age*, *Education*, *Monthly income* (plus the quadratic term of monthly income), *Children 14* and *Welfare outlook*.

There were no statistically significant findings pertaining to gender or number of children under 14, but both variables are kept in the model because of their presence in previous research. Furthermore, respondents aged 55 + are only significantly different from age group 18–34. Lastly, the interpretation of *Welfare outlook* is presented later on, as it is connected to the *Welfare regime* variable. Regarding the ICC, it has barely changed after including a number of independent variables, but this is to be expected as these variables are situated at the individual level (Mehmetoglu & Jakobsen, 2017, p. 206).

The results are as follows: for females the odds are -4.7% lower for voting yes on the referendum compared to men, but this difference is not statistically significant. The dummy coded age variable shows how the age group 18–34 and 35–44 have 17% and 13.2% higher odds respectively, compared to the oldest age group 55+, of voting yes. There is no significant difference between the groups of 35–44, 45–54 and 55+.

Having children under 14 does not contribute statistical significance to the model, thusly the findings cannot be generalized to the population. As for education, those with elementary or secondary school, professional training or A-Levels, have lower odds of -22.9%; -30.9% and -12.2% respectively, compared to those with a university or college degree of voting yes on the referendum. There is no statistically significant difference between the category “other” and the reference category, possibly a result from few observations in the “other” category. As for monthly income, this variable is just barely significant, but holds true with a significance level of 0.05. It is important to remember that income was made a quadratic term, meaning the interpretation must take into account both variables. For each level a respondent advances on the monthly income variable, the odds for voting yes decrease with -7.8%, until it turns upward at one point, and subsequently, the more income a person has increases the odds of voting yes with 2.5%. Figure 5 visualizes the convex curve and reveals the minimum is at around “less than 3<sup>rd</sup> quartile”.



**Figure 4 Curvilinear effect of monthly income**

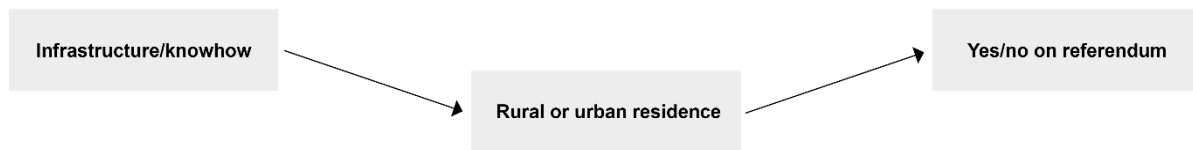
To summarize the findings of the analysis, the carriers of public transportation who want a green innovation in public transportation are represented by younger cohorts, with higher education and higher income. Furthermore, gender and having children under the age of 14 are not statistically significant and their effects cannot be generalized.

### 5.2.2 Materials, Competences, Meanings

The second research question asks: *How does materials, competences and meanings of public transportation affect practitioners' vote?* The variables pertaining to each element were added incrementally, to see whether these variables have confounding effects on the socio-demographic variables (Skog, 2015, p. 259). First off, in model 2 (see table 6), with the inclusion of the two variables measuring meanings, a change occurs in the age variable. Age group 35-44 is now significantly different from those aged 55 or more. Hence, wanting to model a sustainable lifestyle has a confounding effect on age. The rest of the model is left roughly the same. Including all four variables related to practice as entity decreases the ICC from 2.1% to 2.0%.

What is more, when introducing both *Infrastructure* (model 3) and *Knowhow* (model 4), the model is left largely unchanged. Both variables are significant, but they do not alter the interpretation of the other variables in any notable way. With that said, it is interesting to note that from the get-go, a variable measuring whether respondents were from either rural or urban areas was supposed to be included. It is reasonable to imagine that which type of area a respondent lives in has an effect on what they would vote on a referendum regarding public transportation, as public transportation is usually more prevalent in cities. This variable, called *City*, was not statistically significant with the introduction of either *Infrastructure* or *Knowhow*, as both of these variables implicitly uncover whether people have access to public transportation or not. For example, if a respondent is satisfied with the public transportation in their area, it is reasonable to assume they live in an urban area. Consequently, if they do not have access, then they

are likely to reside in rural areas. Therefore, we are dealing with an indirect causal relationship as shown in Figure 6 (Skog, 2015, p. 48):



**Figure 5 Indirect relationship**

As a result of this, the variable measuring rural or urban belonging was left out of the model.

*Infrastructure* states that each jump up from value zero, which is “My area has no public transit”, the odds increase with 9% of voting yes. Those who are very satisfied are thus likely to want an upgraded fleet of public transportation. *Knowhow* states that those with knowledge of how to use public transportation have 38.3% higher odds of voting yes, compared to those who do not use public transportation frequently and as such might lack the required competence.

The variables that measures meanings and consequently sustainable lifestyles, are both significant. The first variable, *Lifestyle network*, states that for each increase in value the odds for voting yes increases with 7.2%; this is to say that respondents who care whether others want them to model a sustainable lifestyle are more likely to vote yes compared to those who do not feel the need. *Lifestyle reflexive* focusses more on what the practitioner feels is important when modelling their lifestyle and it tells us that people who are concerned with acting pro-environmentally have higher odds of voting yes than others. For each value we increment by 1, the odds increase with 31.1% for Y=1. Both the variables that measure meanings increase the odds of voting yes with quite large margins, which alludes to the importance of practitioners wanting to green their lifestyles.

To summarize, the symbolic meaning of environmentally friendly that is attached to public transportation increases the probability of voting yes, for practitioners that either model a sustainable lifestyle based on social network or on their own device. Practitioners who are satisfied with the infrastructural materials and possess competence on how to use public transportation also have higher odds of voting yes.

### 5.2.3 Understanding the Contextual Factors

Lastly, the third research question is formulated as: *How does public transportation as a bundled practice affect practitioners' vote?* The inclusion of level-two explanatory variables does not change the outcome of the remaining variables. What the inclusion of level-two variables does do, is decrease the ICC from 2.1% in the intercept-only model, to 0.8% in the complete model. Thus, these variables go a long way in explaining the variance existing between countries.

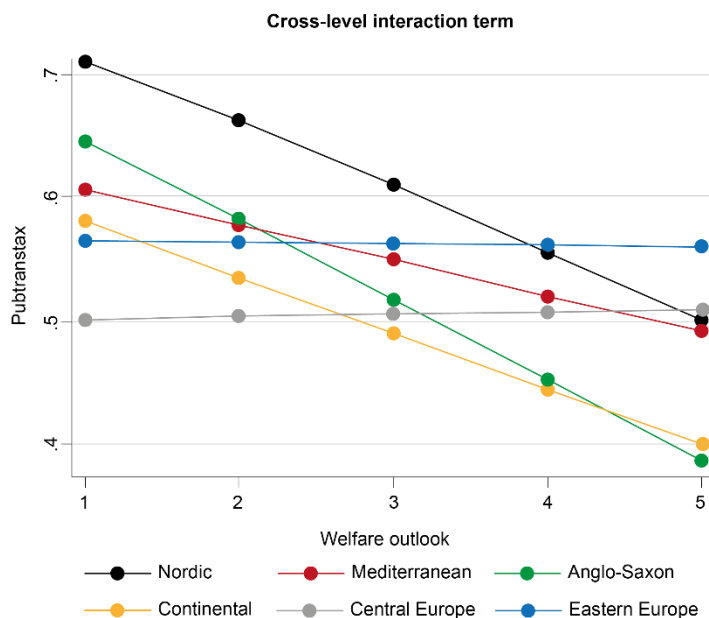
Since *Welfare outlook* is included in an interaction term, the interpretation changes (Mehmetoglu & Jakobsen, 2017, p. 126). Outlook on welfare, because it is interacting with the cluster variable where the Nordic welfare regime is the reference category, now explains how the left-right scale affects respondents within Nordic welfare regimes with



regard to the outcome variable. For every value increase in outlook on welfare the odds decrease with -21.4% for Nordic respondents. Consequently, Nordic right-wing practitioners are less likely to vote yes on the referendum compared to their Nordic left-wing counterparts.

The *Welfare regime* variable, due to its interaction, now shows differences between each and one welfare regime compared to the Nordic one, when respondents have left-wing views on both economic and social issues (*Welfare outlook* set to value zero). I will reel off the percentage of odds ratio for each regime type: Mediterranean -46%, Anglo-Saxon -23.7%, Continental -48.2%, Central European -70.2% and Eastern European -60.1%. There is no statistically significant difference between the Anglo-Saxon and the Nordic left-wing voters. Concerning the other clusters, respondents with left-wing sentiments have a lower percentage odds of voting yes compared to “like-minded” respondents in Nordic regimes.

The interaction term reveals how we cannot understand the effect of left-right views on economic and social issues, when voting on the referendum, without accounting for type of welfare regime the respondents belong to. There are two welfare regimes that do not show significant results, namely the Anglo-Saxon and Continental regime. As for the rest, the interaction term highlights the effect of different outlooks on welfare policies (from left-wing to right-wing), when compared to the Nordic regime. Generally, for the other welfare regimes, for each increase in *Welfare outlook* the percentage of odds for voting yes on the referendum is higher, compared to the Nordic regime. This means that the closer we get to right-wing views on economic and social issues, the Mediterranean, Central European and Eastern European regimes have higher odds of voting yes than their counterparts in the Nordic regime. For the Mediterranean regime, the odds increase with 12.3%, the Central European with 28,3% and Eastern European with 26,6% for each increment by one on *Welfare outlook*. Figure 7 visualizes the cross-level interaction term.



**Figure 6 Cross level interaction**

As for *lnGDP*, the log transformed GDP per capita variable, it is important to remember that log transformations make interpretation of odds ratio harder. Instead of talking about absolute value changes, log transformations entails relative changes (percentual change) (Skog, 2015, p. 241). Therefore, next step is to establish how much one percent increase in *lnGDP* is. Applying the formula  $e^{(\ln(1.49)*\ln(1.01))}$  gives us 1.003, which in turn can be used to find the percentage change in odds ratio.  $100(1.003-1) = 0.3$ . For one percent change in *lnGDP* (measured in 1000 dollars) the odds increase with 0.3% for respondents to vote yes. From this, we can deduce that respondents living in countries with higher GDP are more likely to vote yes for a new public transportation system.

*Passenger km* is statistically significant, and states that for each one-unit shift, that is an increase in passenger-kilometer in a country, the odds of voting yes increase with 2%. Thus, a higher share of public transport of passengers in a country sparks interest for a new sustainable transportation system.

Recapitulating the main effects of linked practices, increases in both GDP per capita and total share of public transportation boosts a practitioner's chances of voting yes. Furthermore, the interaction term tells us that left-wing practitioners from the Nordic welfare regime are the most likely to vote yes, but at the same time, Nordic right-wing voters are less likely to vote yes compared to right-wing practitioners from the Mediterranean, Eastern European or Central European regimes.

## 6 Discussion

The point of departure for this thesis is a proposed material innovation in the shape of a new, more sustainable public transportation system. This is presented as a referendum to inhabitants of EU-28 in addition to Norway, Switzerland and Turkey. In return for this new fleet of transport, the respondents have to pay increased taxes (ECHOES, 2019). Applying Spaargaren's (2000) lens – which combines social practice theory with ecological modernization – our attention is directed towards two key points. Firstly, the material aspect is relevant due to material objects being essential elements of social practices (Reckwitz, 2002); the material innovation also symbolizes how green innovations permeate our ecologically modernized society. Secondly, the proposed referendum asks respondents whether *they* are interested in this innovation, and this emphasizes the consumer's preferences.

Fusing these key points together creates the foundation for this thesis. *What characterizes consumers that want a material innovation in the practice of public transportation?* To answer this, it is crucial to concretize aspects related to the respondents voting on the referendum. The respondents are labelled *carriers* (referring to individuals who perform a practice and, as a result, continuously recreates it) of public transportation based on two conditions. First off, these practitioners take an active stance regarding whether they want a material innovation or not, and that leads to them voting based on their experience with the practice. Secondly, the analysis points out who is more likely to vote yes, and these practitioners are the ones who already are, or will be, the carriers of public transportation.

To highlight what characterizes these carriers who want to see a sustainable change happen in public transportation as a practice, the discussion follows the structure of the three research questions:

- (1) What socio-demographic attributes are characteristic of these practitioners
- (2) How do structural components – *materials*, *competences* and *meanings* – pertaining to public transportation affect their vote
- (3) How is public transportation as a practice affected by linked practices – creating *bundles* – and how does this in turn affect how practitioners vote

These three levels illuminate different aspects of social practice theory: the difference between practitioners (carriers of practice/practice as performance), how structure affects a practice (practice as entity) and how other practices influence a practice (practice as bundles). Ultimately, these three levels provide characteristics of practitioners from different angles. In Spaargaren's words:

Getting to know the habits and orientations of the groups of end-users typically attached to their groups of products and services helps providers and their marketers to construct more elaborate and effective hierarchies of (green) qualities of their products and services. (2006, p. 11)

## 6.1 Who are the Carriers of Public Transportation?

To highlight *who* the carriers of public transportation are, the focus lies on socio-demographic characteristics of practitioners who are willing to vote yes on the referendum. The analysis tells us that these carriers are young, educated and have a substantial income. What gender these practitioners are, or whether they have children, does not have a significant effect on their voting. I will elaborate on these results below.

First off, carriers of public transportation are of a younger age group. Ryghaug and Toftaker (2014, p. 154) touch on the effect of age in their study of electric cars as a practice. When interviewing owners of electric vehicles, the interviewees said they received positive response from younger people, and the informants thought that it was related to how younger people in general are more environmentally conscious. Although this study focuses on electric vehicles, the same line of thought is applicable to public transportation, as research has found that one attached meaning of bussing is that it is environmentally friendly (Cass & Faulconbridge, 2016, p. 7). Consequently, others can perceive practitioners using public transportation as eco-conscious.

One of the reasons why younger people are more inclined to adopt sustainable practices – in this case wishing for a more sustainable fleet of public transportation – is found at the heart of the ecological modernization (EM) theory. EM theory states that the environmental movement we are seeing today started during the 1980s, coinciding with the Brundtland-report (1987) on sustainable consumption (Berger, Flynn, Hines, & Johns, 2001, p. 56). This environmental process is gaining increasing traction and, thus “it has led to new ‘rules of the game’” (Spaargaren & Van Vliet, 2000, p. 56). It is reasonable to think that the timing of this environmental wave, and the diffusion of ecological indicators, have varying effects on eco-rationality, depending on age. On the one hand, an older practitioner is likely to have been recruited to practices that are not as environmentally friendly compared to competing practices of today, due to ecological indicators and eco-rationality not being as prevalent as they are today. In Warde’s (2005, p. 138) words: “The performance of driving will depend on past experience, technical knowledge, learning, opportunities, available resources, previous encouragement by others”. Consequently, older practitioners can be said to follow the older rules of the game, while younger practitioners are growing up in a society where environmental awareness and indicators are in an advanced stage and permeate practices. This causes incongruity between age-groups with regard to values pertaining to environmental awareness.

To elaborate on this incongruity, younger practitioners who, from a young age, are exposed to environmental indicators in a plethora of practices are enabled to create green portfolios of practices (Spaargaren et al., 2007, p. 26). These portfolios represent the knowledge and skills that practitioners assemble over time, and they are used to make choices on how to perform practices. Consequently, because one meaning of using public transportation is that it is environmentally friendly, it is easier for younger practitioners to gather knowledge on how to perform this practice as they are likely to be more proficient in handling environmental products and rules. This ultimately leads to younger practitioners being in favor of a new sustainable innovation within public transportation as a practice.

These practitioners have higher education, represented either by a college or university degree. In their research on sustainable transportation practices, Kennedy et al. (2013, p. 264) discover that persons with higher education are more likely to pick up pro-

environmental practices. A reason for this is that the green portfolios of practitioners expand when attending higher education, as they acquire resources and knowledge that decreases the barriers for participating in sustainable practices. One type of resource these practitioners reinforce is cultural capital (see Bourdieu's (1984) types of capital). Cultural capital will be used by the practitioner to navigate between practices, in hope of finding the most advantageous combination of economic, cultural and social capital (Spaargaren, 2000, p. 57).

The acquisition of green knowledge and skills is a consequence of the general trend of ecological modernization, where institutions are gradually adhering to ecological indicators. This implies that universities are increasingly applying ecological indicators in their production process (Olya & Alipour, 2015, p. 113). Thus, by participating in higher education as a practice, practitioners are exposed to environmental-related issues, by the institution and like-minded practitioners. It follows that the symbolic meaning of public transportation as environmentally friendly is relevant (Cass & Faulconbridge, 2016, p. 7), as this might be deemed an important aspect of public transportation for practitioners with higher education. Thus, practitioners possessing a degree from higher education could find themselves wanting a new fleet of public transportation, seeing as they have a portfolio containing the necessary capital to embody this "new" practice.

These carriers are not only young and equipped with higher education, they also boast a substantial monthly income. Previous research states that higher income correlates negatively with an uptake of sustainable transportation (Kennedy et al., 2013, p. 264). This is a result of practitioners with high income usually having stable careers, which implies a stable income that makes it easier for practitioners to be recruited to the practice of car driving, as these practitioners can afford to buy private vehicles (Kennedy et al., 2013, p. 264; Viladot, 2018, p. 417). Once a car is attained, it is often deemed a better alternative to public transportation, as it is easier to navigate between practices, and cars express identity and freedom (Cass & Faulconbridge, 2016, p. 6; Iyanna et al., 2019, p. 8).

To add to this, Iyanna et al. (2019, p. 6) take a deep dive into meanings related to public transportation in United Arab Emirates and discovers that there exists a cultural stigma. This stigma is related to how public transportation caters to low-income groups and is, in some countries, thought of as lower status – or as *loser cruisers* – compared to private vehicles. It is not outlandish to think that public transportation in some European countries might also have some negative meanings attached to it (Iyanna et al., 2019, p. 8). With that in mind, it is interesting that, in this analysis, a higher monthly income in a household substantiates the want for a new fleet of public transportation.

As Spaargaren (2003, p. 689) points out, practitioners have varying lifestyle segments, where each segment contributes differently to environmental issues. A practitioner can, for example, only consume green food products, but at the same time drive a fuel guzzling SUV. This is because, for a practitioner to choose a green practice, it has to be able to compete with existing ones: "Up to a point, it may be useful to think of practices collaborating and competing for resources and attention" (Shove et al., 2012, p. 68). If a new fleet of public transportation could provide a more time-efficient and mobile system, then practitioners might be willing to substitute cars with this new alternative. This means that high income practitioners are willing to pay extra taxes, if it materializes in a renewed mode of public transportation that is more sustainable and can challenge meanings related to car driving, such as temporal and spatial freedom and autonomy (Cass & Faulconbridge, 2016, p. 7).

Furthermore, even though Iyanna et al. (2019) chart negative meanings attached to public transportation, another meaning of public transportation is that it is environmentally friendly (Cass & Faulconbridge, 2016). In ecological modernization green technology is acknowledged as important and a referendum that has the potential of strengthening the understanding of public transportation as environmentally friendly could only help improve its status. Hence, in a time when ecological indicators are used to judge environmental behavior, practitioners might deem acting eco-rational as more important than caring about if public transportation is associated with low-income groups or status (Iyanna et al., 2019, p. 6). Practitioners with high income could therefore be enticed by a transportation system that is deemed environmentally friendly, as they want to portray to others that they actively try to create a sustainable lifestyle. Furthermore, the reinforced meaning of public transportation being environmentally friendly could outweigh the negative meanings associated with public commute. Thus, if affluent practitioners think of public transportation as a mode of transportation for practitioner with lower income or status, this could change with the introduction of a new system.

Pursuing the last argument that I presented, there is a point to be made that the three characteristics highlighted in the discussion thus far paint a picture of a group of practitioners that boast high socioeconomic status. If they are the future carriers of the new public transportation fleet, then the status surrounding public transportation could be changed.

Due to the provision of a new environmentally friendly public transportation system, practitioners are empowered to model a sustainable segment of their lifestyle, namely transportation (Spaargaren, 2003, p. 690). This theme of sustainable lifestyle is common throughout this discussion, in the sense that high income earners are willing to invest in a new sustainable transportation system if it means that they can substitute non-environmental friendly practices; practitioners with higher education acquire values and tools from educational institutions to model a sustainable lifestyle (or portfolio) in practices such as public transportation; and younger practitioners are exposed to environmental values and indicators, which puts increased attention on creating sustainable lifestyles. A new material innovation in public transportation enables these practitioners to alter their lifestyles, which makes voting yes on the referendum an alluring option.

Having children under the age of 14 or the gender of the practitioner does not show any significant effect on what vote the carriers of public transportation would cast. As referenced earlier, previous research has found that children have a positive effect on sustainable transportation (Jaeger-Erben & Offenberger, 2014; Kennedy et al., 2013). Although these studies report positive correlations, it is plausible to suggest that children are carriers of a plethora of practices that requires transportation. In most instances, a car – and not public transportation – will be the preferred choice of transportation because of time-constraints and safety (Jaeger-Erben & Offenberger, 2014, p. 590). There could be some truth to both explanations, as some areas – for example suburban ones – have public transportation that is directly linked with school and other activities (Kennedy et al., 2013, p. 267), while other locations might have restricted access to public transportation resulting in cars being the preferred transport of choice. Thus, having children might affect practitioners differently depending on how the travelling circumstances are where they live.

As for gender, Kennedy et al. (2013, p. 267), in their study on use of sustainable transport, detect the same outcome in their analyses: gender is not significant. With that

said, there might be variation in patterns of how public transportation is used by men or women in different countries. Iyanna et al. (2019, p. 7) find, in their study of public transport in United Arab Emirates, that women cherish the meaning of freedom attached to car-driving as a practice because these women often take care of business related to childcare, shopping and more. Although, in the case of Iyanna et al. (2019) there is a clear preference for car-driving, in instances where a car is not available or affordable, public transportation is a common substitution when it comes to means of transport. Thus, public transportation could be used by both genders frequently, but the motive of using public transportation could vary between genders.

## 6.2 How Does Materials, Competences and Meanings of Public Transportation Affect Practitioners' Vote?

Materials, competences and meanings (these constitute the practice as entity) are understood as the shared social meanings – knowledge, skills and materials – of public transportation (Spurling et al., 2013, p. 19). These three elements are exogenous to the carriers of practice and help guide how actions are performed. To understand why practitioners vote the way they do on the referendum, it is important to gain insight concerning how these structural components influence the vote. In the analysis, four measures operationalized these elements.

First, *infrastructure* (materials) provides an overall view of the infrastructure pertaining to public transportation as a practice and reveals how practitioners who are satisfied with the transport system in their vicinity are more likely to vote yes. This measure, although describing contentment with public transportation, implicitly describes variation in the areas that the practitioners reside in.

Second, *Knowhow* (competence) delineates between those who have competence, meaning those who use public transportation regularly, and those who do not use it regularly and therefore lack competence. *Knowhow* states that those with competence are more likely to vote yes. Furthermore, similarly to *infrastructure*, there is an indirect causal relationship at play with regard to where practitioners live (Skog, 2015, p. 48). If practitioners have limited access to public transportation, then their competence and skills could be lacking.

Third, *Lifestyle network* (meanings) reveals that practitioners who values the opinion of others – situated in either the EU, their country or their municipality – when it comes to environmentally laden issues, are more likely to vote yes on the referendum. Finally – *Lifestyle reflexive* – tells us how reflexive individuals, who want to model a sustainable lifestyle, are likely to vote yes on the referendum. Both *Lifestyle network* and *Lifestyle reflexive* are connected to Spaargaren's (2000) concept of sustainable lifestyle because previous research declares that one meaning attached to public transportation is its environmentally friendly profile. In other words, there is a natural connection between the symbolic meaning of public transportation being environmentally friendly and the aim for practitioners of modelling a sustainable lifestyle. The importance of the three elements for explaining public transportation as an entity and how this in turn affects voting on the referendum, is further elaborated below.

### 6.2.1 The Material Element of Public Transportation

To perform the practice of public transportation naturally requires materials, and these materials either render certain actions possible, or, on the contrary, limit bodily and mental activities (Reckwitz, 2002, p. 253). Consequently, those who have no access to public transportation are the least likely to vote yes, presuming that they live in smaller rural areas as mentioned in the analysis. Previous research on the consumption of distance states that practitioners who were commuting from the hinterland in the United Kingdom preferred to use cars, as there was no immediate access to public transportation facilities. An extension of this observation is that access to practices that can substitute car-driving is dependent on geographical location (Aldred & Jungnickel, 2014, p. 594). My data reflects this argument, as the bulk of respondents in ECHOES (2019) that do not have access to public transportation live in rural areas, while the majority of respondents that are very satisfied reside in cities.

“The design and operation of infrastructures, mains water systems, cities and transportation networks reflect and structure inequalities of access and hence the social distribution of different practices” (Shove et al., 2012, p. 40). As Shove and Pantzar touch upon, public transportation is often regarded as an exclusively urban practice and hence, practitioners dwelling in rural areas are less inclined to vote yes on a material upgrade of a practice that they are not previously carriers of. Thus, public transportation is recognized as an inferior mode of transport to a car, because rural practitioners are keen on taking direct routes and to be flexible when travelling between practices, which is even more important when driving long distances (Aldred & Jungnickel, 2014, p. 594). This is aptly expressed by an interviewee in Cass and Faulconbridge’s study: “There isn’t a bus! I’d have to go on a bus from Asda, to town and a bus from town all the way back along the prom to get home (Helena)” (2016, p. 9). What’s more, materials, competences and meanings are all connected and cannot be thought of as separate entities. Even though practitioners who live remotely, with limited access to public transportation, value the symbolic meaning of public transportation being environmentally friendly, this meaning will not stack up against the lack of materials.

Most of the practitioners that are content with the public transportation system in the vicinity, reside in cities. Public transportation being a predominantly urban practice means that these practitioners likely are carriers of this practice, or at least acknowledge that this practice can be a viable substitute for cars. Aldred and Jungnickel (2014, p. 594) state that practitioners who reside in the city had the least material restrictions regarding public transportation, but many thought public transportation was a lackluster alternative to car-driving. Moreover, reversing the argument from earlier, for the practitioners who do not have access to a car, it is beneficial to have public transportation close by (Cass, Shove, & Urry, 2005, p. 550). This is where the renewed fleet of transportation – with a strengthened meaning of being environmentally friendly – can become an attractive option; it is an attractive option as a result of public transportation being easier to navigate in urban areas, where they are easily connected to other practices.

Furthermore, a revamped public transportation system and an increase in taxation can alter other meanings related to this practice. The discovery of negative socio-cultural meanings connected to public transportation by Iyanna et al. (2019) might hold true in some European countries but the increased focus on sustainability, upgraded materials and heightened taxes could change these meanings into more positive ones. If practitioners stop thinking of public transportation as a type of loser cruiser (Iyanna et



al., 2019, p. 6), it makes it easier to recruit practitioners from other segments that are not usually associated with public transportation.

### 6.2.2 The Competence Element of Public Transportation

Competence, skills or knowhow, is the tacit knowledge of practitioners required to take use of materials to perform in various practices (Watson & Shove, 2008, p. 71). The competence that is needed for public transportation is reading timetables, paying for tickets and navigating between routes, to name a few (Cass & Faulconbridge, 2016, p. 7). The closing segment on infrastructure mentioned how it cannot be understood as an isolated element, and the same goes for competence and materials. The lack of competence on how to use the materials when it comes to public transportation makes it less likely for these practitioners to vote yes on a material upgrade.

Correspondingly, competence and materials go hand in hand, and in areas where a practice is emerging – as opposed to established – the level of competence required to perform the practice can be more demanding (Aldred & Jungnickel, 2014, p. 5). This is described by the informant in Cass and Faulconbridge's (2016, p. 6) study, where one informant states that she has to navigate between several routes to get home. For her to travel home, there is more skill needed to make sure the trip is as efficient as possible, compared to a practitioner in the city taking the underground directly to the designated location.

With that said, the competence required to perform public transportation is easily acquired compared to other mobility practices, like for example cycling. Learning to ride a bike from scratch, plus having to be in good physical condition, result in a higher threshold for practitioners to embody this skill (Viladot, 2018, p. 419). As for public transportation, many of the skills related to the practice can be self-taught and if a practitioner has used one type of public transportation, then chances are that they can transfer this competence to other modes of public transportation (Shove et al., 2012, p. 42). With this in mind, the demarcation of competence is not first and foremost with regard to the materials involved, but naturally between the practitioners of public transportation and those who use other modes of transportation. This tells us that the practitioners, who want to vote yes on the referendum, most likely already are practitioners of public transportation.

The competence required for public transportation usage is connected to the meanings of public transportation and, as highlighted, one such meaning is that it is environmentally friendly. The way meanings shape practices manifests itself in practitioners' skills and how they perform the practice (Schatzki, 2002, p. 86). This idea is emblematic of ecological modernization: "Actors have been given a minimum amount of basic knowledge and possibilities to choose within all consumption domains and corresponding lifestyle segments" (Spaargaren et al., 2007, p. 20). Hence, practitioners of public transportation have chosen to use their skills to learn this practice, due to its environmental friendliness. Choosing public transportation as a mode of transport allows these practitioners to create narratives that reflect sustainability. These practitioners – who have learned the skills of public transportation for environmental reasons – are of course inclined to vote for an even more sustainable system of public transport.

### 6.2.3 The Meaning Element of Public Transportation

The symbolic meaning of environmental friendliness that is connected to public transportation can function as an important tool for recruitment (Cass & Faulconbridge,

2016, p. 7). Although the symbolic meaning of public transportation being environmentally friendly is present in the present practice, an introduction of new infrastructure would change the elements of competence and meanings. Thus, a new fleet of public transportation will, in this case, strengthen the meaning of public transportation as environmentally friendly, and consequently, practitioners will adhere differently to this adjusted practice.

Naturally, every individual cannot be a practitioner of public transportation as each individual ends up with different galleries of practices; as Røpke (2009) so appropriately puts it: "Since time is limited, practices can be said to compete for the attention of practitioners" (p. 2493). Therefore, practices have to recruit practitioners to persist, and one method of recruiting is through social networks (Shove et al., 2012, p. 53). Previous research accounts for how groups of practitioners – residing in the same neighborhood and participating in sustainable practices – can convince non-group members to live greener (Kennedy, 2011; Kennedy et al., 2013). In these scenarios, it is groups of individuals recruiting other individuals.

Instead of using the vantage point of closely knit and dense social networks, as Kennedy (2011; 2013) does with social networks in neighborhoods, the perspective of the analysis is on larger social networks, these being the EU, country or municipality. Consequently, if a practitioner feels a sustainable lifestyle is valued highly by others in the EU, their country or municipality, they could be persuaded to alter their own lifestyle to be more sustainable, leading to a positive vote on the referendum. Aldred and Jungnickel (2014, p. 3) corroborate these assumptions with similar findings in their research on cycling in various urban areas in the United Kingdom. They state that meanings related to cycling are connected to aspects of social identity and the area it is performed in.

As Shove and Pantzar (2012) point out: "Channels of recruitment change as the careers of individuals, practices and related infrastructures and institutions develop" (p. 54). A channel of recruitment that has changed is explained by ecological modernization, in that ecological indicators have gained importance and are used to assess everything from practitioners to organizations (Spaargaren, 2000, p. 325). A consequence of this is that practitioners actively seek to model sustainable lifestyles. Consequently, the fact that one symbolic meaning of public transportation is that it is environmentally friendly means that if one practitioner thinks others find it important to model a more sustainable lifestyle, they might consider public transportation a worthwhile practice to assimilate and thusly be recruited to. This means that an increasing focus on ecological indicators pushes more practitioners towards sustainable consumption, making an extensive social network. If a practitioner feels that they have a strong social network backing them, they are more likely to try other practices, like public transportation (Kennedy et al., 2013, p. 262). To summarize in three steps: (1) with ecological indicators gaining independence, value is given to sustainable behavior in society as a whole; (2) the introduction of a more sustainable fleet of public transportation will strengthen the already existing meaning of public transportation as environmentally friendly; (3) practitioners who are seeking to model a sustainable lifestyle, and value the opinion of others, are likely to be recruited from other competing practices like car-driving.

This interpretation is in accordance with Ryghaug and Toftaker's (2014, p. 154) findings, in the study of electric vehicle (EV) owners, as they were complimented and gained positive feedback from others. Furthermore, these EV owners were seen as adopting environmentally friendly lifestyles: "There was a widespread consensus that they were

contributing to curbing emissions and this seemed to have made many of them adopt an identity of being a bit more 'future oriented'" (Ryghaug & Toftaker, 2014, p. 154).

In addition, the sustainable narrative that a practitioner wants to tell others is constituted of each and all practices one participates in (Spaargaren et al., 2007, p. 17). With the new fleet of public transportation being explicitly labelled "more environmentally friendly", practitioners who want to model segments of their lifestyle as sustainable, might find this new mode of transportation attractive. Thus, the reinforcement of public transportation being environmentally friendly means that the meanings attached to the practice is appealing to practitioners aiming to live greener. By virtue of its meanings, public transportation as a practice recruits its own practitioners, as this practice "logically and historically precede individuals" (Røpke, 2009, p. 2493). To that end, it is not only social networks that recruit practitioners, but practitioners who are reflexive and eco-conscious would want to vote yes on the referendum, as this provides them with a new mode of transportation that makes their segment of transportation greener.

In conclusion, the symbolic meaning of public transportation as environmentally friendly can lead to an increase in recruitment of practitioners, both because practitioners are reflexive individuals creating their own narratives and because social networks recruit new practitioners.

### 6.3 How Does Public Transportation as a Bundled Practice Affect Practitioners' Vote?

To provide a holistic view of public transportation as a bundled practice, macro-level characteristics can help explain how voting on a new material innovation in public transportation is affected by adjacent practices, sometimes in unrecognizable ways (Shove et al., 2012, p. 64). In my analysis I used GDP per capita, share of public transportation and type of welfare regime to describe how the perception of public transportation varies between countries. Although these measures cannot be labelled as practices on their own (for example, GDP per capita is not a social practice), they still affect a plethora of practices that practitioners adhere to in their everyday lives, public transportation among others. To help illuminate this broader view of practices, theories of welfare regimes will supplement social practice theory and ecological modernization. Consequently, these three perspectives will be used interchangeably in the discussion.

Higher GDP in a country increases the probability of its inhabitants voting yes on the referendum. This interpretation reinforces the findings of monthly income – that economic well-being makes practitioners more willing to pay more taxes for a new sustainable fleet of public transportation.

Total share of public transportation tells us that practitioners living in countries that have larger shares of public transportation of their total inland transportation are more likely to vote yes on the referendum.

Lastly, the historical foundations of different welfare regimes shape practitioners' views on welfare issues. The interpretation of welfare regimes effect on practitioners does not necessarily give further context to public transportation as a practice, but rather diverts our attention to questions of trust in welfare states and public institutions, approval of taxation and political views. This is relevant, not only as broader context for public transportation as a practice, but to understand how practitioners might have different

voting patterns based on what views they hold and which welfare regime they belong to. How GDP per capita, share of public transportation and welfare regime influence voting on a referendum regarding public transportation as a practice, is clarified below.

### 6.3.1 How High GDP Enables Green Thinking

Previous research have used both GDP and household income and found positive correlations with increased use of public transportation (Santos et al., 2013). Although, it can be argued that the case study of Iyanna et al. (2019) United Arab Emirates contradicts these findings, considering UAE is a country with substantial GDP per capita (CIA, 2020a) and it is mainly expats that are using the public transportation, not the natives. Literature on eco-welfare regimes supports the latter suspicion, namely that the increase in GDP often correlates with an increasing ecological footprint (Koch & Fritz, 2014; Zimmermann & Graziano, 2020).

Even though the interpretation is similar to that of monthly income, GDP per capita allows us to discern characteristics of countries, and not of individuals. Ecological modernization sees the gradual environmental change of societies as a result of ecological indicators gaining relevance, but these indicators does not exist in isolation (Spaargaren & Van Vliet, 2000, p. 56). GDP per capita is an economic indicator and as Spaargaren (2000) explicates: "Ecological modernization theory argues that the independent set of ecological criteria should be used *alongside* other, existing economic criteria in order to adequately judge the productivity or performance of industries and technologies" (p. 326). Thus, ecological modernization presupposes all countries are moving towards a greener future, but naturally, there are variations in how countries adapt to this new modernity.

One such variation is found between welfare regimes (see Esping-Andersen (1990)). A higher GDP per capita can be an indicator of what type of welfare regime is likely to adopt new, green innovations: Countries with a higher GDP, low income inequality and high social expenditure, have been found to apply heavy environmental taxation, compared to countries with lower GDP (Koch & Fritz, 2014). Consequently, these characteristics in conjunction with high GDP hint at welfare clusters such as the Nordic one, as this cluster contains countries with low income inequality, high social expenditure and substantial GDP per capita (CIA, 2020a). The welfare foundations of these countries, with extensive taxation in place and diffusion of ecological taxation, make it so that practitioners are more inclined to vote yes on a referendum that deals with increased taxes for a sustainable means of transport.

With that said, large ecological footprints often correspond with a higher GDP, hence these countries are not necessarily vanguard nations when it comes to emissions and sustainability (Koch & Fritz, 2014; Zimmermann & Graziano, 2020, p. 17). Although these countries emit considerable amounts of greenhouse gasses, it is the population within that are affected by institutions of the welfare regime, which predisposes many practitioners to vote yes.

In summary, on the one hand we have countries with a high GDP that cluster with other welfare regimes that have an abundance of green taxes, in addition to comprehensive taxation to fund the welfare state. On the other hand, welfare clusters such as the Central European, Eastern European and the Mediterranean, largely include countries with a relatively low GDP per capita, where income inequality is higher and there is less expenditure on social welfare and less use of environmental taxes (Koch & Fritz, 2014, p. 687). This is highlighted by the total expenditure on environmental protection in Eastern

European and Central European regimes, which is respectively 1.8% and 1.9% (Lauzadyte-Tutliene et al., 2018, p. 111). Practitioners of these countries have contrasting premises for voting on the referendum, in the sense that their welfare state is not as actively exposing its citizens to green taxes and environmental protection. This in turn leads to these practitioners having less incentive to vote yes on the referendum.

Welfare regimes that are characterized by a high GDP per capita and extensive taxation schemes possess traits common for pioneering countries, a term used in ecological modernization to describe nations that adopt innovative environmental policies (Jänicke, 2005, p. 129). To become a pioneering country, there must be breeding ground for environmental policy, in concomitance with having strong economic, institutional, and informational traits (Jänicke, 2005, p. 137). As follows, countries with a large GDP per capita are more likely to be pioneering countries when it comes to implementing environmental policies, for example in the form of a referendum on a new sustainable fleet of public transportation. This is in accordance with ecological modernization's view that the environmental crisis can be solved, without altogether abandoning structures related to modernization, such as production and consumption (Spaargaren & Mol, 1992, p. 335). So, the idea that the co-existence of economic and ecological indicators is feasible comports with the fact that an increase in the GDP per capita results in countries having the tools needed to be pioneers in implementing environmentally innovative policies. Ultimately, a higher GDP results in more resources which enables countries to be innovative in their policymaking when it comes to environmental issues.

In addition, pioneering countries usually have the right characteristics for implementing innovative environmental policies due to the educational level. A higher GDP is often found to correlate with higher levels of education in the populace, resulting in a generally heightened focus on problems related to environmental protection (Jänicke, 2005, p. 137). This argument coincides with the interpretation of higher educated practitioners being more inclined to vote yes on the referendum; in countries where the general level of education is high, there are more practitioners keen on innovating public transportation as they possess the required green knowledge to do so.

In this way, GDP per capita can be used as an indicator for understanding which welfare regimes (see Esping-Andersen's (1990) typologies) – based on their foundations of environmental policies and taxes – are likely to include practitioners that are more likely to vote yes. Furthermore, ecological modernization stresses environmental innovation in both technology and policymaking, and countries with a higher GDP per capita are more likely to be the pioneers of these innovations (Jänicke, 2005). This highlights, with regard to the practice of public transportation, how we cannot understand a practice isolated from its surrounding practices. A practitioner voting on a referendum that deals with public transportation does not only consider their experiences with that specific practice – it is, in this case, important to account for structures within countries and how they affect a practitioner's vote on the referendum.

### 6.3.2 The Importance of Accessible Public Transportation

A high share of public transportation in a country elucidates how established practices, in this case public transportation, has a sound foundation for recruiting practitioners. An established practice of public transportation would mean a high share of public transportation, which indicates a developed material basis and competent practitioners. Compare this to countries where the share of public transportation is low, where the infrastructure is less developed and practitioners use other modes of transportation

(Shove et al., 2012, p. 21). Previous research states how the number of buses correlates positively with an increase in use of public transportation (Santos et al., 2013, p. 19). As a practice, public transportation has a handful of materials, competences and meanings that are connected to it, which are shared across spatial and temporal spaces. Depending on how strong the co-existing practices that compete for practitioners are, there will likely be some variation in how public transportation evolves in different countries (Shove et al., 2012, p. 110). In countries where public transportation constitutes a sizable amount of inland transportation, the elements of public transportation are strong, and it is easier for practitioners to recognize this practice as a valid substitute for other private modes of transportation. And it is likely that a large share of public transportation is a result of how the practice has evolved over time, with policymaking and infrastructural planning strengthening its place in comparison to competing practices (Shove et al., 2012, p. 110). Introducing a referendum on a new system of public transportation, when a sturdy foundation already is in place, will only increase practitioners' want for this change.

The meanings alluded to in the last paragraph are challenged by car driving, because driving gives more freedom and, most importantly, makes it easier to organize time, as time is a limited resource (Iyanna et al., 2019, p. 7). Consequently, for many practitioners the only real option is car-driving, considering that the practices they partake in necessitate unsustainable mobility (Cass & Faulconbridge, 2016, p. 4). In countries with a large share of public transportation, these meanings related to car-driving that impede recruitment to public transportation, might not hold true to a similar degree. These countries have public transportation systems that enable practitioners to link different practices together. When practitioners have a positive understanding of public transportation's meanings, because of a sufficient supply of materials, it is easier to get them onboard with a new and improved fleet of public transportation.

Another factor that plays a role in how practitioners who live in countries with large shares of public transportation vote, is the extent of ecological modernization which is present in that consumption domain. Spaargaren (2007, p. 19) highlights how end-users of products are confronted with sustainable choices, but these options are not always recognized as relevant depending on the ecological modernization of the domain of consumption. Hence, countries with considerable passenger-kilometers in public transportation give an indication of how practitioners use their knowledge of varying options in the mobility domain and that they frequently choose public transportation (Spaargaren et al., 2007, p. 20). So, the mobility consumption domain is substantially greener in countries with a higher share of public transportation, compared to countries where the share is low (Spaargaren, 2011, p. 816). Practitioners in these countries find it easier to choose an alternative to car-driving as they have extensive knowledge of the green options in the mobility domain, consequently making a choice of improving the transport system an easier choice to make.

### 6.3.3 Why Left is Not Necessarily Right

The act of voting on the referendum cannot be seen in isolation, as there are cultural differences that influence practitioners. With regard to the interaction term, there are three segments that constitute its totality.

This discussion focuses on the variation between clusters, that means the interpretation dealing with *only* the Nordic regime is excluded. When discussing comparisons between left-wing practitioners of different welfare regimes it is important to note that there was

no statistically significant difference between the Nordic and Anglo-Saxon regime. The last part of the interaction term, which shows the general effect of the left–right scale in welfare regimes when voting on the referendum, shows no significant differences between the Nordic regime and the Continental plus Anglo-Saxon regime. To make the interpretation of the interaction term easier, left-wing views are synonymous with being pro collectivism and extensive governmental control, whilst right-wing views are synonymous with pro individualism and a negative perception of governmental intervention (Jakobsen, 2011, p. 327).

The first thing that is worth mentioning is that left-wing practitioners in Nordic regimes are more likely to vote yes on the referendum compared to left-wing practitioners of any other regime. This is because the predominant political stance of practitioners can be said to reflect the welfare type they belong to (Jakobsen, 2011, p. 336). And welfare regimes are built on different value bases, which is a result of the political history of each country, where the historical trajectory of the Nordic regimes has evolved around social democratic parties' policies, where certain ideals such as income equality, universal social benefits and an expansive welfare state is promoted. To maintain these ideals, considerable tax rates are implemented (Soede et al., 2004, p. 33). Nordic practitioners are willing to pay these taxes, as the income the government collects from taxes are used to build on the aforementioned ideals. This means that Nordic practitioners that hold left-wing views, and who belong in the Nordic regime, do not mind paying an extra tax for a new public transportation system, seeing as their outlook on economic and social issues are similar to that which the welfare state is built upon. Consequently, the same premise is applicable to other welfare regimes, where for example, a left-wing practitioner from the Eastern European welfare regime finds herself living under a welfare state where government expenditure is low and income inequality is high (Lauzadyte-Tutliene et al., 2018, p. 110). The way her welfare state handles economic and social issues does not necessarily reflect her stance on the matter.

One explanation why a left-wing Nordic practitioner considers a referendum that proposes an increased tax in exchange for a new public transportation system as enticing, is due to trust. Trust in governmental institutions reduces the costs of economic transactions, as practitioners have trust in others, public institutions and the judicial system (NOU 2011: 7, 2011, p. 47). Bjørnskov and Svendsen (2013, p. 280), in their research on governmental trust, found that social trust increases with the size of the welfare state. Using an indicator of trust (asking whether "in general, do you think most people can be trusted?") to measure trust within welfare regimes, found the Scandinavian countries and Finland all scored above 50% on the trust indicator, compared to the average 30% of the remaining 110 countries included in the survey (2013, p. 274). To reiterate, left-wing practitioners of the Nordic regime are supportive and trust their welfare state, which in turn is a consequence of how this welfare state historically came into being.

Left-wing practitioners from the Mediterranean, Continental, Central European and Eastern European welfare regimes reside in welfare states with different historical points of departure. In these welfare regimes, social trust is lower, making economic transactions – such as a new tax on public transportation – harder to pull off. Lower trust levels are a result of how decommodification and stratification is handled within each type of welfare state (Arts & Gelissen, 2002, p. 142). For example, the Mediterranean regimes include countries that are identified by turbulent political histories, with common themes being authoritarian or colonial rule up until recently; because of the volatile

history of these countries the welfare states are no monoliths, resulting in low social expenditure and income inequality (Gal, 2010, p. 296). Consequently, even if you are a left-wing practitioner in a Mediterranean welfare state, the historical trajectory of this welfare state shapes a practitioner's view, leading to these practitioners not having the same social trust in their welfare state, compared to a practitioner from the Nordic regime.

This brings us to a second discovery. Practitioners from the Mediterranean, Central and Eastern European welfare types that do not hold left-wing views, but rather centrist or right-wing, are more likely to vote yes compared to Nordic practitioners. It does to some extent make sense that the Continental welfare type is not significantly different from the Nordic, as the Continental regime is associated with left-wing policies and have comparable tax rates to Scandinavian countries (Soede et al., 2004, p. 32). The fact that Anglo-Saxon is not significantly different is more of a conundrum, as this is a welfare regime that is characterized by low taxes and little governmental intervention.

As for the other three welfare regimes, this tells us how practitioners that hold right-wing views do not differ that much from their left-wing counterparts. As mentioned, for a left-wing practitioner there might not be much trust given to the state, as this trust has to be the result of history and an expanding welfare regime (Bjørnskov & Svendsen, 2013). Thus, left-wing and right-wing practitioners are more homogenous compared to their equivalents in Nordic regimes. A right-wing practitioner in the Nordic regime is less likely to vote yes compared to a left-wing practitioner, because the right-wing practitioner's political view is diametrically opposed to that of the welfare state. As with the first part of the discussion that dealt with who the *carriers* of public transportation are, there is variation in what political views these practitioners hold depending on the welfare regime they belong to. In Norway, this referendum is likely to recruit practitioners with left-wing views. But, in the Eastern and Central European models, practitioners from both sides of the left-right scale are likely to vote positively.

## 6.4 Summing up the Characteristics

To get an overview of what characterizes the practitioners, it is necessary to connect the dots from all the different vantage points that social practice theory allows us to view the issue – a new public transportation system – from. The practitioners who want to see a change in the practice of public transportation are identified by the socio-demographic indicators age, education and income. These characteristics paints a picture of a well-to-do segment of society, consisting of young, educated, and affluent practitioners – these are the *carriers* of public transportation.

The elements of public transportation – materials, competences, meanings – illuminate how public transportation as an entity affects the carriers of public transportation in their vote. Access to infrastructure tells us that practitioners are likely to be situated in cities. Furthermore, they are competent in using public transportation and, as a result of public transportation having a symbolic meaning of environmental friendliness, practitioners looking to turn their mobility segment greener is inclined to vote yes.

These practitioners all live in various countries and voting on a referendum on public transportation cannot be seen as a vote on an isolated practice. Practices are constantly affected by intersecting practices and institutions, which cause similar practices to be idiosyncratic depending on the country it is located in.



Firstly, practitioners wanting a new public transportation system reside in countries with a high GDP, which in turn could mean a pioneering country that is willing to implement innovative environmental policies.

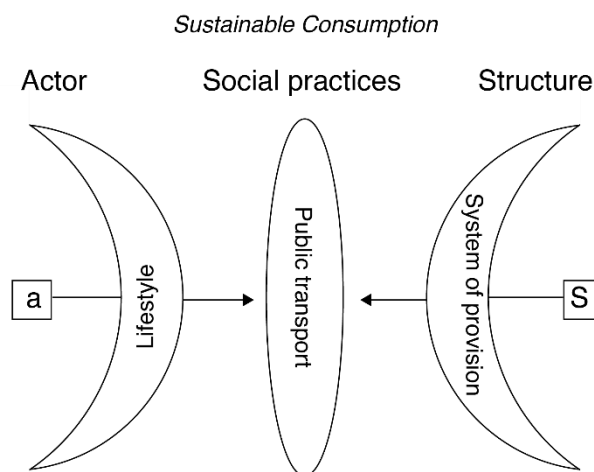
Secondly, practitioners residing in countries where the share of public transportation is high are more likely to have access to a current fleet of public transportation that is supported by policies and infrastructure, and this makes for a good foundation to implement a material innovation. A high GDP per capita and a large share of public transportation can be true for one and the same country, but this is not always the case as many Central and Eastern European countries are the ones boasting the highest passenger-kilometres (Eurostat, 2020c). Thus, share of public transportation has to be thought of as an independent indicator.

Thirdly, the last characteristic pertaining to practitioners who want a material change, is their belonging to welfare regimes. Practitioners are affected by the historical foundations of their welfare state, which means that in – for example a Nordic country – the referendum might strike a chord with the left-wing practitioners, but not so much with those holding right-wing views. This might not be the case in other welfare regimes where the historical foundation differs from that of the Nordic regime, where practitioners holding left-wing or right-wing views are less contrasting.

## 6.5 Understanding Innovation

The basic domain of study of the social sciences, according to the theory of structuration, is neither the experience of the individual actor, nor the existence of any form of social totality, but social practices ordered across space and time. (Giddens, 1984, p. 2).

This is the basic premise of social practice theory, to assign practices as the structuring element of life as we know it. With this as the background for analyzing a material innovation in public transportation, it has posed both challenges and opportunities.



The social practices model

Looking back at Spaargaren's model (2003), my aim was to use an *analysis of strategic conduct*, where emphasis is put on consumers (or practitioners) as knowledgeable agents. This type of analysis is intertwined with Spaargaren's (2000) concept of sustainable lifestyle which is adopted from Giddens. In the discussion, a degree of free will has been given to reflexive individuals, in the sense that it is assumed that they are capable of choosing what narrative they want their lifestyle to tell others. This approach has been criticized by some scientists (Røpke, 2009, p. 2493; Warde, 2005, p. 136), as it is thought of as too individualistic and that this is exactly one of the pitfalls practice theory intends to avoid. This could imply that the discussion exhibited in this thesis is no different from interpretations originating from psychology or behavioral economics.

The counter-argument is that these individuals – although knowledgeable agents – adhere to practices and the appurtenant social meanings and rules. Where actor-centric perspectives are often criticized for losing sight of social and cultural meanings, this is not the case with social practice (Heisserer & Rau, 2015, p. 582). Practitioners who model sustainable lifestyles, choose public transportation because this practice has a social meaning as, for example, environmentally friendly – to mention one out of many meanings – which is important in a world where ecological modernization is prevalent. Furthermore, structural constraints – such as infrastructure or share of public transportation – are usually disregarded in actor-centric theories, and once again, this has not been the case when using a practice perspective. The point of departure has been that social practices precede practitioners.

To further exemplify, research on sustainable transportation rooted in the individualist paradigm propose marketing campaigns and personalised travel plans – to name a few – as effective methods to reduce car-use (Möser & Bamberg, 2008, p. 12). If we think of the referendum as a tactic to inform consumers about a new, more, sustainable fleet of transportation, then the focus would be on how consumers act rationally to the product and the increased taxes (Spurling et al., 2013, p. 7). Contrastive to the individualist paradigm, the social practice perspective emphasize practitioners' reaction to the referendum based on the practices they partake in and, most importantly, based on their prior experience of public transportation as a practice. Thus, from an individualist perspective, any consumer could find the new public transportation system appealing. However, if we learned this consumer was elderly and lived in a country with a low share of public transportation, then – from a practice perspective – this practitioner is likely to have access to the practice of car-driving; they give less importance to the shared social meaning of environmental friendliness; and they reside in a country where public transportation does not have a strong foothold. It is not a rational decision to vote on the referendum, the practitioner is the crossing point of the practices they participate in and in this instance it is more likely that the practitioner would vote no.

As for the structuralist paradigm, we can do a similar exercise. Imagine the referendum was ignored from the local authorities and, instead, the new fleet was implemented without reaching out to the practitioners (Spurling et al., 2013, p. 6). If this technical innovation was brute forced into a rural area, the practitioners living there might not be recruited. If these practitioners did not have access to public transportation related materials prior to the new fleet, they lack the necessary competence to organize their travel as efficient as possible. And, as always, the new fleet would do well to dethrone the practice of car-driving, seeing as this is almost always thought to be a better practice for travelling long distances. Consequently, it is hard for these practitioners to understand the environmental benefit of the new transportation system, when it is

implemented without consideration of existing patterns of social practices (Spaargaren, 2013, p. 232).

Based on this, using a social practice perspective on public transportation has made it possible to look at both capable, reflexive agents, and how structural components affect the way practitioners eventually vote on the referendum. Furthermore, the discussion avoids the pitfalls of both the individualist and structuralist paradigm that is, as of today, the dominant perspectives on transportation.

## 6.6 An Opportune Time

As for the methodological approach, it has presented ontological headaches. As mentioned in the methodology chapter, using secondary data does pose a challenge (Spotswood et al., 2015, p. 26). The outcome variable fits the theoretical program of Spaargaren to a tee, but it does not explicitly measure a practice and neither do the independent and explanatory variables. Social practice theory's objective of placing practices as the unit of analysis is contradictory with surveys where individuals are the central unit, such as ECHOES (2019) that seeks to understand individual behavior (ECHOES-project, n.d.). Shove (2012) completely invalidates questionnaires based on individual perceptions: "This sort of information is of little value if the aim is to understand and potentially shape the range of practices of which contemporary society is formed" (p. 115). I contest that using cross-sectional studies like ECHOES, in combination with social practice theory, is actually a fruitful approach as long as, and I repeat, social practices are always assumed to logically precede individuals. This requires the researcher to employ an interpretative style when choosing and discussing variables. For example, in my case, the incompatible perspectives of individuals and practices were apparent when picking out variables related to public transportation as entity. Materials, competences, and meanings are all included in my model and they are thought of as elements that individuals cannot change, but that they have to adhere to. Thus, a respondent in ECHOES answer's that they are not satisfied with the access to public transportation, this is a consequence of the *material* element of public transportation.

Additionally, using a multilevel model approach has proved successful, as it opens up new possibilities that strengthens the co-use of quantitative methods with social practice theory. These new possibilities is first and foremost opened by the level-two explanatory variables, which allows us to get a glimpse of how practices bundle together and affect each other. Although the primary focus was given to practices as *bundles*, level-two variables also have the potential to further contextualize practices as entities, as is highlighted by the variable measuring total share of public transportation. This measure is revealing of how materials, competences and meanings of public transportation is perceived in a country. Another important aspect is that researchers can lift their gaze from individuals to country-level characteristics, which feels more compatible with the abstract concept of practice. Thus, applying multilevel models with social practice theory has the potential to discover context of practice as bundles and as entities. Lastly, using a multilevel method with a social practice theoretical lens should be encouraged, because an important task of researchers is to challenge the predominant view held by political and industrial actors, which is that of consumers as *homo economicus* (A. Browne, Medd, Anderson, & Pullinger, 2014, p. 5). And so, it is an opportune time for the use of multilevel models with social practice theory, to challenge status quo.

## 7 Conclusion

The overarching research question of this thesis is: *What characterizes the consumers that want a material innovation in the practice of public transportation?* The main findings of the discussion put focus on different traits of practitioners, as three different levels pertaining to public transportation as a practice is researched.

First off, the *carriers* of public transportation (those performing the practice) who wants to see the practice undergo a material change are young, well-educated and have substantial income. These sociodemographic factors describe future candidates of a new and sustainable public transportation system. Secondly, the elements of public transportation reveal how these potential *carriers* of public transportation are predominantly situated in urban areas (materials). Furthermore, these practitioners possess the required knowledge and skills (competence) for utilizing public transportation, and this pre-existing competence suggests that these practitioners are frequent users of public transportation. The last element (meaning) suggest these practitioners are eco-conscious and are likely to vote yes on the implementation of an upgraded, more sustainable, fleet of public transportation because participating in green practices are valued highly by the practitioner. However, these eco-conscious practitioners could also be recruited through social networks to this new practice, because green practices are valued highly in the age of ecological modernization.

Additionally, practitioners' likelihood of voting yes on the referendum is affected by the country they reside in. These practitioners live in countries that either have: (1) high GDP per capita, as this characterizes countries with sufficient means to implement innovative environmental policies; (2) a large share of public transportation, as these countries have the required policies, infrastructure and attitudes in place, making a revamp that much easier. There is also variation in how practitioners vote based on their outlook on social and economic issues, (3) depending on what type of welfare regime they belong to. Practitioners holding left-wing views are more in favor of voting yes, but a left-wing practitioner from the Nordic welfare regime is more likely to vote yes compared to a practitioner from any other welfare regime.

The overarching research question highlight how characteristics pertaining to individuals, infrastructure and historical context reveals who potential carriers of the new public transportation practice are. These are the potential practitioners willing to green their lifestyle with regard to the mobility domain (cf. Spaargaren (2003, p. 690)).

### 7.1 Weeding out Elements, not Individuals

The information obtained by using multilevel modelling can prove useful for policymakers and as an alternative to *soft* and *hard* policy measures. Important to note, this is just a suggestion on how policymakers might employ insights from a multilevel model when using social practice theory, and not an adamant claim that the findings presented in this thesis should be the foundation for policymaking. As a plethora of variables used have an interpretive nature, it is impossible to guarantee correlation.

Firstly, the distribution of a new infrastructure pertaining to public transportation could recruit new *carriers*. The research on the proposed referendum studied in this thesis appoints younger, well-educated and well-to-do practitioners as potential carriers. As Shove and Pantzar call attention to, policies are taken notice of by practitioners at different stages of their lives (2012, p. 112). With that in mind, it is important to ask if the current users of public transportation expand with younger, well-educated and affluent practitioners, or if these new carriers replace other groups of carriers.

In a report from the European Environment Agency (2013, p. 46) on urban transport in big cities of Europe, it is found that the majority of commuting is related to business or education. Thus, practitioners equipped with higher education will not necessarily expand the existing group of users, because these practitioners presumably are employed and carry experience with public transportation from their studying days. As for the recruitment of practitioners with higher income, there is reason to believe that they could diversify the catalogue of end-users. Although an increase in GDP has been found to correlate positively with increased shares of public transportation (Santos et al., 2013, p. 19), most studies have found that an increase in this economic indicator correlates positively with a surge in car-ownership (EEA, 2013, p. 49). If practitioners with substantial income phase out their habitual use of the practice car-driving – and instead turn to public transportation – it could result in an aggrandized customer base.

On the downside, if the recruitment of well-off practitioners is due to their capacity to pay a higher tax, this could result in the neglect of current end-users that use public transportation because of its reasonable price (EEA, 2013, p. 50). Furthermore, these current practitioners could be younger of age, as they sometimes use public transportation out of necessity. With that said, this thesis establishes that younger practitioners welcome a new public transportation system, because an environmentally friendly mode of transport fits the principles of ecological modernization. Therefore, a material change in the practice of public transportation could lead to an influx of high-income earners. This should be heartily welcomed by policymakers, because these practitioners are likely to add to the total number of end-users.

Secondly, policymakers have to understand the implementation of a new public transportation system in light of car-driving as a competing practice. The eco-conscious current that permeates modern societies is one indicator that this new fleet of public transportation can contest car-driving. A symbolic meaning of public transportation is its environmental friendliness, an enhancement of this meaning can result in practitioners' recruitment through social networks. Thus, by policymakers changing the material element of public transportation, it will lead to a change in the meaning of public transportation, which in turn can result in increased recruitment of practitioners wanting to exhibit a greener lifestyle.

Thirdly, a focus on the elements of practices allows policymakers to weed out the bad elements, instead of changing the behavior of individuals (Shove et al., 2012, p. 105). For example, the discussion around materials and competence points out that practitioners living rurally find the competence of public transportation arduous because they often must trip chain to arrive at their area of destination. This manner of using public transportation involves time-consuming travelling and a little too much organizing, and this is off-putting for rural practitioners. Because of this, the practice of public transportation finds it hard to compete with car-driving. Hence, if policymakers want to appeal to practitioners living outside of cities or urban areas, a material upgrade should go hand in hand with a simplification of competence. This implies that the material

innovation should aim at creating a nonstop link to cities or other desired designations. Alternatively, policymakers could see urban areas as better suited to implement the new public transportation system, as the majority of practitioners already possess the required competence.

Fourthly, policymakers also have to be aware of the dispositions of practitioners towards public transportation and, concerning these dispositions, how they differ between groups of practitioners (Warde, 2005, p. 139). A policy dealing with the improvement of a public transportation system is better suited for implementation in countries where practitioners use public transportation frequently. If this policy is implemented in a culture where public transportation has positive meanings, satisfactory materials and practitioners by and large possess the required competence, then others are likely to be recruited from competing practices.

Furthermore, policymakers should acknowledge the historical context of the welfare regimes practitioners belong to. A vote on a referendum asking for a material change in the practice of public transportation has to be understood historically and culturally (Shove et al., 2012, p. 104). When practitioners vote on this referendum it is affected by their perspective on economic and social issues, which in turn is shaped by the historical heritage of the welfare regime they belong to. To exemplify, this referendum would be greeted positively by left-wing practitioners in Nordic countries, but not so much by the political right side. Furthermore, the right-wing practitioners from Nordic countries are less likely to vote yes compared to right-wing practitioners from the other three – Mediterranean, Central, and Eastern European – welfare regimes. Therefore, attracting positive attention – with regard to the referendum – from the right-wing practitioners in the three aforementioned regimes could prove less challenging. This is especially true for the Eastern European regime, where right-wing practitioners are as likely to vote yes on the referendum compared to their left-wing counterparts (see Figure 7). Consequently, in these countries it is likely that a mix of right-wing and left-wing practitioners could vote yes, but in the Nordic countries it is conceivable that the predominant votes of yes are by left-wing practitioners.

Policymakers could find a little more success with this referendum in the Nordic and Eastern European welfare regime. In the Nordic regime, left-wing practitioners trust that their taxes will be spent in a way that reflects their values and ideals, which makes them favorites to vote yes on a referendum regarding the practice of public transportation. As for the Eastern European regime, the fact that both left-wing and right-wing practitioners have high probability of voting yes on the referendum, result in these countries being potential candidates for policymakers.

In comparison to soft and hard policy measures rooted in individualist and structuralist paradigms respectively (see Möser and Bamberg (2008)), social practice theory brings a more nuanced tool to the table. Through the lens of soft policymaking, the focus could be on informing consumers of a new, sustainable, fleet of transportation to modify their perception of this mode of transportation (Möser & Bamberg, 2008, p. 11). In turn, consumers' attitudes are potentially changed, leading to them adopting public transportation. It is all well and good to provide information about sustainable behavior but, a main point of contention – from a social practice perspective – is that other elements have to be taken into consideration. It is not enough to highlight the meaning of public transportation as environmentally friendly if other elements pertaining to public transportation are unable to facilitate recruitment of practitioners, or if competing

practices, such as car-driving, are deemed essential by practitioners for relocating between practices.

The same critique applies to hard policy measures, as they only take consideration of material innovations and lose sight of the practitioner (Spaargaren, 2013, p. 237). The socially shared meanings and competences of public transportation that practitioners adhere to, must be taken account of when implementing a new transportation system. As follows, social practice theory enables policymaking that promote sustainable behavior building on knowledge where both practitioners and structures are accounted for.

## 7.2 For Future Studies

The discoveries laid forth in this thesis paint a picture of general characteristics pertaining to practitioners. It would be interesting for further studies to use these characteristics to identify countries where the implementation of a sustainable transportation system would be appropriated by a large majority of practitioners, and to discern which characteristics that are most influential. For instance, Turkey is the country where the most respondents in ECHOES (2019) replied they would vote yes on the referendum. Is this because of the materials already in place, Turks being particularly engaged with reducing emissions related to mobility, or due to the majority of the population possessing the necessary competence?

Furthermore, future work using social practice theory in combination with multilevel modelling in the field of sustainable consumption is encouraged. This thesis has shown how a quantitative approach enables researchers to focus on the potential of practitioners as agents of change, all the while taking consideration of social structures. Furthermore, quantitative techniques allow us to zoom out and chart general tendencies. Tendencies that would be harder to detect with qualitative methods. Hence, quantitative techniques could prove fruitful for subsequent qualitative analysis that can further examine the *lifeworld* of these specific groups of carriers.

Lastly, a wider catalogue of research using multilevel modelling with social practice theory will make it easier for future researchers to discern types of level-one and two explanatory variables that are suited to further contextualize practices as entities or practices as bundles.

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# Appendix

**Table 7 Representativity in ECHOES**

Country	Indicator					
	age		gender		monthly income	
	mean age in sample	median age of population	% males in sample	% males of population*	Sample**	population***
Austria	42.8	43.2	53%	49%	€ 1,487	€ 2,063
Belgium	42.0	41.6	50%	49%	€ 1,543	€ 1,899
Bulgaria	42.6	44.2	50%	49%	€ 324	€ 299
Croatia	42.6	43.5	50%	49%	€ 465	€ 518
Cyprus	42.2	38.2	51%	49%	€ 1,058	€ 1,208
Czech Rep.	42.7	42.3	50%	49%	€ 680	€ 690
Denmark	47.7	41.8	51%	49%	€ 2,093	€ 2,449
Estonia	40.1	42.1	55%	49%	€ 805	€ 782
Finland	42.7	42.7	52%	49%	€ 1,772	€ 1,999
France	42.7	41.4	51%	49%	€ 1,682	€ 1,840
Germany	42.8	46.0	49%	49%	€ 1,653	€ 1,827
Greece	42.4	44.7	50%	49%	€ 587	€ 633
Hungary	42.9	42.6	48%	49%	€ 379	€ 416
Ireland	42.8	37.5	50%	49%	€ 1,685	€ 1,907
Italy	42.7	46.3	50%	49%	€ 1,102	€ 1,379
Latvia	41.1	43.5	53%	49%	€ 600	€ 551
Lithuania	43.0	43.8	55%	49%	€ 549	€ 511
Luxembourg	46.5	39.6	53%	51%	€ 3,076	€ 3,006
Malta	42.1	41.6	48%	51%	€ 1,079	€ 1,208
Norway	42.7	39.5	50%	49%	€ 2,780	€ 3,206
Poland	42.8	40.7	50%	49%	€ 498	€ 495
Portugal	39.6	44.9	50%	49%	€ 745	€ 756
Romania	43.7	42.2	50%	49%	€ 222	€ 229
Slovakia	42.7	40.2	50%	49%	€ 521	€ 599
Slovenia	42.6	43.7	50%	49%	€ 777	€ 1,059
Spain	42.8	43.8	50%	49%	€ 1,096	€ 1,184
Sweden	42.7	40.8	51%	51%	€ 1,746	€ 1,948
Switzerland	47.1	42.5	46%	49%	€ 3,056	€ 3,688
Netherlands	42.7	42.6	50%	49%	€ 1,684	€ 1,963
Turkey	38.4	31.4	52%	51%	€ 414	€ 313
UK	42.9	40.0	49%	49%	€ 1,675	€ 1,750
<b>Total</b>	<b>42.8</b>	<b>41.9</b>	<b>51%</b>	<b>49%</b>	<b>€ 1,228</b>	<b>€ 1,367</b>

\* Obtained by taking each country's ratio of women per 100 men.

\*\* Estimated mean value of equivalised monthly income in EUR; obtained from dividing the net household income per number of household members (based on quartile and 90th percentile cut-offs from survey respondents.)

\*\*\* Estimated median value of equivalised monthly income in EUR (obtained by taking the 5th decile of each country's annual income and dividing it by 12 months).



