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PhD Thesis

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Public responses to climate change mitigation policies

Postoje veřejnosti k politikám mitigace změny klimatu

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Declaration

Prohlašuji, že jsem disertační práci napsala samostatně s využitím pouze uvedených a řádně citovaných pramenů a literatury a že práce nebyla využita v rámci jiného vysokoškolského studia či k získání jiného nebo stejného titulu.

I hereby declare that this dissertation is the result of my own work and that I wrote it independently, using only duly listed and properly cited sources and references; and that it has not been submitted in connection with any other university course or in fulfilment of the requirements of the same degree or of any other.

October 22nd, 2017 in Prague

Eva Kyselá

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Abstract

Research on public responses to climate change mitigation policies is proliferating. Therefore, a need to critically review the existing research practice arises. Studies published over the last 15 years ($n=164$) and focusing on public attitudes and responses to climate policies are reviewed in this thesis with respect to *a*) measures and operational definitions of policy support, acceptability, acceptance, and other types of responses and *b*) factors related to such responses. A great diversity of measures and measured constructs, frequent lack of theoretical embedding, and conceptual vagueness are currently pervasive in the field. Such state leads to uncertainty of what is being measured, ambiguity, and greater diversity and lower comparability of results. In response to this state, the thesis proposes a construct of policy attitudes and responses as an overarching concept comprising the diversity of measures and constructs already in use, and a theoretical framework, based on the Value-Belief-Norm theory, as a heuristic tool for measurement, analysis, and interpretation of survey results. Additionally, the thesis discusses the interlinkage of public opinion on climate policies and policy-making process to argue the relevance and the role of the reviewed research.

Three original studies are part of the thesis to empirically support the presented arguments and propositions: study 1 on differences between measures of policy attitudes; study 2 on interactions between policy characteristics and political orientation; and study 3 on factors related to perceived characteristics of different policy instruments.

Keywords: *public opinion; climate change; mitigation; policy; attitudes; public responses to policies*

Abstrakt

Předložená disertační práce je založena na systematické rešerši empirických studií publikovaných v posledních 15 letech ($n=164$), které zkoumají postoje veřejnosti vůči mitigačním politikám změny klimatu. Rešerše studií se zaměřuje *a)* na způsoby měření a vymezení konceptů přijatelnosti, podpory a dalších reakcí a postojů veřejnosti k mitigačním politikám a *b)* na faktory, které s těmito postoji a reakcemi souvisí. V současném výzkumu existuje značná různorodost způsobů měření, používaných konstruktů i operacionálních definic, přičemž velmi často chybí jakékoliv teoretické ukotvení měřených konceptů. Tento stav vede k nejistotě a neurčitosti z hlediska měřených konceptů a jejich validity, ale i k větší různorodosti a nižší srovnatelnosti získávaných výsledků. V reakci na tento stav je v práci navržen konstrukt postojů a reakcí na klimatickou politiku založený na zavedené obecné definici postojů a teoretický rámec, vycházející z teorie Hodnoty-Přesvědčení-Normy, který má sloužit coby heuristický nástroj pro měření, analýzu a interpretaci výsledků. K doložení relevance zkoumaného tématu a metodologických otázek se disertační práce rovněž zabývá propojením veřejného mínění o klimatických politikách a procesu tvorby těchto politik.

V práci jsou zahrnuty tři původní studie, které empiricky dokládají či ilustrují vznesené argumenty a návrhy. Studie se zabývají rozdíly mezi měřenými konstrukty postojů k environmentální politice (1), interakcemi mezi charakteristikami politických strategií a politickou orientací dotazovaných (2) a faktory souvisejícími s vnímanými charakteristikami různých politických nástrojů (3).

Klíčová slova: *veřejné mínění; změna klimatu; mitigace; politika; postoje; reakce veřejnosti na politiky*

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List of abbreviations

DK	<i>Don't Know</i>
EM method	Expectation Maximization method
ESS	European Social Survey
ISSP	International Social Survey Programme
MNL regression	Multinomial Logistic regression
NAM	Norm Activation Model
NEP	New Environmental/Ecological Paradigm
SPSS®	name of statistical software
STATA®	name of statistical software
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
VCN	Value-Belief-Norm Theory
WTP	Willingness to Pay

1. Introduction

With the international debate on climate change mitigation policy continuing and reaching new deals and challenges, research on public responses to policy proposals is proliferating. Policy makers are keen to know what GHG emission reduction policies may be accepted by the public and what may induce opposition or struggle to find popular support or acceptance. Regarding public opinion as a key factor to policy feasibility, policy makers often see the lack of policy acceptability or support among citizens as a barrier to policy implementation. Therefore, the demand for studies of public opinion about climate change mitigation policies rises. Responding to this demand, researchers usually focus on description and explanation of attitudes toward diversely formulated policy proposals. Far less attention, however, is paid to methodological and conceptual side of the issue.

As the field is relatively young and quickly growing, a need to summarize the vast and diverse results arises. Yet the task is a difficult one. The state of the art in existing research raises caution with respect to what general conclusions can we make. The diversity of measures and constructs, frequent lack of any theoretical embedding of these measures, and methodological vagueness all make it troublesome to formulate any general policy recommendations. Nevertheless, such recommendations are not only being made, but also demanded by policy-makers. Universal recipes for policy success are attractive as always.

Therefore, addressing the methodological and conceptual issues which have been marginalised so far, the goals of this dissertation are:

- a) to propose a construct of policy attitudes and responses as an overarching concept comprising the diversity of measures and constructs already in use and providing a theoretical background for comparison between them;
- b) to propose a theoretical framework as a heuristic tool for measurement, analysis, and interpretation of survey results on public responses to climate change mitigation policies.

These goals will be attained a) by reviewing existing measures and constructs of attitudes toward climate change mitigation policies, especially *policy support* and *policy acceptability* or *acceptance*, and by embedding the concept of policy attitudes and responses in a theory of attitudes, and b) by identifying factors related to public responses to climate change mitigation policies and by summarizing them systematically within a framework based on a theoretical model. A comprehensive systematic review of 164 studies examining determinants of policy acceptability, acceptance, or support in the last 15 years was conducted for these purposes (for earlier version of the review including some results see Zvěřinová, Ščasný, & Kyselá, 2014).

Additionally, the thesis discusses the interlinkage of public opinion and policy-making process, since policy feasibility is a frequent argument for policy relevance of existing research on public responses to mitigation policies. In analysing the role of the public in policy making, the text is focused on the role of public opinion surveys as the main source of information about public attitudes towards policies and policy instruments. Active public participation through social movements, but also through individual acts such as petitioning and taking part in demonstrations is set aside. These are with no doubt key elements of public engagement in policy making and a wealth of research is dedicated to them. From the

theoretical and methodological point of view, however, these behaviours are different from attitudes.¹

Sociology, namely political sociology, has largely ignored public opinion surveys in its examinations of political systems, governance, and political power in past decades and dismissed the previous long-standing tradition of polling in the pre-war era (Manza & Brooks, 2012). Political science, on the other hand, has actively explored the interlinkages of public opinion and policy making and debated the nature and the significance of public opinion in the policy-making context. These ongoing debates, including a discussion of their relevance to measurement of public responses to climate change mitigation policies, are summarized in chapter 2.

An overview of measures used in research of public responses to GHG emissions reduction policies provided in chapter 3 is focused on conceptual and operational definitions of diverse policy responses, such as policy acceptability, acceptance, and support and their measurement and implications for analysis and interpretation of results. Building on the conclusions of the methodological discussion in the previous chapter, the literature review in chapter 4 aims at understanding policy attitudes in two perspectives – as a general evaluative tendency toward climate change mitigation policies and as policy-specific evaluations.

A general conceptual framework for measuring and analysing policy responses is proposed and discussed in chapter 5. Stemming from recommendations for operationalisation of policy responses, the proposed framework aspires to summarize existing knowledge to an adaptable frame, which can be further used to formulate research questions and analytical models and to interpret existing results with increased comparability and ability to generalise to appropriate levels (e.g., refraining from inferring conclusions about climate policy in general from results on specific policies).

Three empirical studies are added to the thesis to further support or exemplify some of the conclusions made throughout the text. Study 1 explores prevalent measures of *policy support* and the differences in results obtained by using them, thus supporting the discussion on conceptual and empirical differences between measures of public responses to climate change policies reviewed in chapter 3. Study 2 deals with changing policy formulation and the interaction between policy frames and individual characteristics of the respondents. Study 3 focuses on relationships of perceived policy characteristics with the variables of the Value-Belief-Norm theory model as one of the most commonly applied models in the field. The two latter studies provide empirical examples of interactions between the characteristics of individuals and evaluated policies as discussed in chapter 4. Study 3, furthermore, offers new insights into the role of perceived policy characteristics in models of policy attitudes and thus informs the formulation of the proposed framework.

Since the problem at hand lies on the boundaries of several disciplines, the analyses and results presented here are interdisciplinary. Insights were drawn from political science and

¹ Although the subject is treated here as attitudes toward policies, it can be, and often is, regarded as a type of environmentally significant behaviour, namely passive behaviour in public sphere (Stern, 2000). The differences in these conceptions are discussed in chapter 3 of this text, but all reviewed authors agree upon the distinction from other environmentally significant behaviours, such as active public engagement or private environmentalism. Moreover, in social movements and activism, the focus is on the minority of issue public and those actively pursuing some interests, while there is a passive majority which does not (yet) take any active stance on many issues. In their attitudes, beliefs, and values, however, lie the foundations of possible actions; their attitudes, views, and opinions create (and are created by) the social environment, culture, and institutions. This work, therefore, is focused on this majority.

public opinion research, social psychology, behavioural sciences, and economics. In the current empirical research of policy responses, these disciplines meet only rarely (e.g., Hoff-Elmari, Bardi, Matti, & Östman, 2014), although they study the same object and can inform each other. This text aims to bring the diverse disciplinary works together. By summarizing what we know so far and what we yet need to learn, the thesis should provide methodological and conceptual support for future research. In accordance with an argument by Stern, Sovacool, and Dietz (2016), this text is based on the proposition of “the value of replacing the stylized assumptions about human behaviour that are common in policy analysis, with ones based on data-driven science” (p. 1).

The approach taken here is methodologically individualistic. By itself, such approach is not sufficient or adequate to deal with such a complex issue as climate change is. Moreover, in line with the critical points raised by some sociologists (e.g., Shove, 2010a, 2010b), this analysis recognizes that solely individualistic perspective places responsibility to deal with climate change mainly on individuals and omits the key role played by institutions, organisations, policy regimes, and culture. While all this is undoubtedly true, research of individual behaviour and attitudes is seminal in understanding and exploring the reactions of societies to climate change.

2. Democratic policy-making and public responses to policies

2.1. Introduction

While most authors in the field claim public acceptability or support of climate policies to be of great importance to the process of policy making, only few spent some time to explain why (e.g., Bernauer & Gampfer, 2015). As far as the studies reviewed in this thesis go, none elaborated on the topic in more than a few sentences. In general, research on public opinion in political science lacks wider theoretical and conceptual debate (Burststein, 2006; Druckman, 2014) and political sociology omits public opinion almost entirely from its considerations (Manza & Brooks, 2012). In this chapter, conceptual problems and issues in political relevance of public opinion and its research are discussed in relation to public responses to climate change mitigation policies as expressions of attitudes (i.e., evaluations of policies with some degree of favour or disfavour) aggregated in surveys and polls.

Public opinion is often reified through polls and their results and treated as an object, a relatively stable characteristic of the population (a distribution of opinions), or a single public decision. Nevertheless, “[p]ublic opinion is neither a group, institution, or structural aspect of a society *nor the discrete states of mind of a set of individuals*. Rather, it refers to continuous interactions and outcomes” (Crespi, 2013, p. 2; emphasis by EK). As such, public opinion forms around issues and evolves in time (Price & Roberts, 1987).

Similarly, public support, usually conceived as public opinion regarding a specific policy or issue, i.e., *popular support*, is far broader and more complex than any single policy response measured in surveys and cannot be reduced to any such policy response, whether it is termed “support” or not. Rather, public or popular support is public opinion as a set of interlinked processes which are *public* “in the sense that they operate together, across levels, in shaping collective responses to social issues” (Price & Roberts, 1987, p. 781).

Similar to public opinion polls, studies of public responses to policies represent only a fracture of the complex communicative nature of public opinion as a social and communication process (Price & Roberts, 1987). Public opinion is “a complex of communication processes, involving inter-level relations over time, where people, groups, and organisations play differentiated roles” (Price & Roberts, 1987, p. 781). According to this processual view, polls and surveys of attitudes are part of the process as mediated representations of public response to an issue (Price & Roberts, 1987). Together with other such representations, like medias’ outtake of the public and the public debate, activism, and others, survey results lay ground to *perceived* “public opinion”. Public opinion is by no means reducible to the perceived “public opinion”.² In this respect, therefore, the following text does not analyse the whole public opinion process, but focuses on the interlinkage between perceived “public opinion” (with special focus on polls and surveys as mediated representations of public response) in the public opinion process with respect to political actors and their perception of it.

² The term “public opinion” is pervasively used to denote the representation of public responses to an issue mediated by polls and surveys as well as public opinion conceived more broadly as a communication process involving a diversity of actors (not only polled individuals). In most empirical studies, public opinion is represented by results of polls and surveys and hence the following text focuses on this particular representation, although broader perspective is considered, especially on theoretical level.

The importance of policy attitudes in the policy-making process is commonly stated in research of public responses to policies. Kraft (2011) argues that “[w]ithout a supportive public, governments are unlikely to enact and implement strong environmental policies that are perceived to constrain individuals’ lifestyles, limit their rights, or raise their taxes” (p. 409). Gaunt et al. (2007) state that it is now commonly accepted that successful implementation of road user charging relies heavily on public acceptability, and Kallbekken and Sælen (2011) extend this argument on environmental taxes. According to Druckman (2013), decision makers would not risk to pass laws not supported by citizens or accepted by consumers in the marketplace. Drews and van der Bergh (2015) in their review of policy acceptability research mention key studies in policy responsiveness and similar studies in energy transition, but given the goal and length of the review, they do not elaborate on assumptions behind these studies. Marquart-Pyatt and colleagues (2011) argue that “[i]t would be naïve to think that public acceptance of CC as a major problem translates directly into the implementation of effective climate policy. But it would be equally naïve to think that such beliefs do not matter at all” (p. 40). Their argument then builds on results showing that these beliefs influence policy support and continue with a claim that the ongoing political inaction in the US has been sustained by strong opposition augmented at least in part by “lagging public support”. They, like many others, do not provide any support for such claim.

Public opinion researchers often assume a certain model of policy-making process and the role of public opinion in it (Althaus, 2006; Price & Neijens, 1997). Brooks and Manza (2006) state it clearly: the “assumption is that the structure of democratic political institutions gives government officials incentives to incorporate information (or make heuristic attributions) concerning the preferences of the electorate”. Among others, this assumption is probably the reason why most researchers do not argue why policy attitudes are important. King, Manville, and Shoup (2007) argue, however, that “[t]he idea that a policy cannot be approved in the absence of popular support is at odds with the way policies are actually advanced” (p. 122). The case in the US makes a point in a similar direction: while results of public opinion polls show generally high prevalence of positive attitudes toward governmental action on climate change (Brewer, 2004; Krosnick & MacInnis, 2013), until recently the government did not pass any significant laws or decisions regarding climate change for decades, with the exception of not joining the Kyoto Protocol.

Following a general model proposed by Price and Neijens (1997), the policy-making process has five broad stages which occur more or less in this order: (1) elicitation of basic values and problem identification followed by (2) development of options and possible solutions, i.e., policies, (3) estimation of their consequences, (4) evaluation of selected alternatives, and (5) the final decision. All actors enter the process in each phase and theories differ in who has the largest influence when. Regarding the role of public opinion in the process, Althaus (2003) sums up the possible uses of it in “identifying issues requiring political action”, “applying or resisting political pressure”, “holding politicians accountable to the public’s preferences”, and “formulating policy” (p. 257). He further argues that the majority of public opinion researches assumes public opinion entering the process at the semi-final stage of evaluation of alternatives (see also Price & Neijens, 1997).

Other authors have pointed out the influence of public opinion in the first stage of policy-making process. Easton (1965; see Roberts, 2011 for short summary) states that policy making is responsive to three types of inputs: demands (problems are identified by groups which then pressure for policy makers to address them), resources (financial, human,

information, and other), and supports: democracy is viable only as long as the governed support it at least passively (obey laws, pay taxes, accept election results etc.). Public opinion can influence policies both as a demand and as a support. Habermas too sees the role of public opinion as Easton's demand – in identifying issues needing attention and pressuring for their resolution (Althaus, 2006).

Within the processual perspective, policy responsiveness and the interlinkage of public opinion and policy-making process are sub processes of communication (collective opinion) and legitimation (political role of collective opinion) (Crespi, 2013). "In a democracy, the free expression of collective opinion is the accepted source of *legitimately* organized political authority" (Crespi, 2013, p. 110). Several debates or controversies however arise in relation to legitimation processes. Namely, what role does, and should, the collective opinion play in government (see above), how should the government respond, and how much confidence should be placed into public opinion when making decisions. These debates are further discussed in the remainder of this chapter.

2.2. Policy responsiveness

The assumption that public opinion is considered by policy makers in their decisions is generally concluded from the focus of representative democracies on elections – a key characteristic of modern democracies is their governments' responsiveness to "preferences" of citizens (Dahl, 1971, p. 1)³. As representatives are elected by the public, they have an inherent motivation to pay attention to public's wishes and evaluations of governmental actions (Erikson, 2007).

The evidence in support of this assumption seems to be quite broad, but not yet fairly conclusive (Burstein, 2003). Shapiro (2011), Burstein (2003), Olmastroni (2010), and Page (1994) provide an account of what has been done and what are the future directions. Similarly, Burstein (2003, 2010) overviews research results and issues. An early and highly cited work by Page and Shapiro (1983) can be regarded as a tipping point in the increase of policy and democratic responsiveness studies in a variety of fields, for example a broad area of welfare policies (e.g., Christian, 2008; Manza & Brooks, 2012; Mehrtens, 2004) or governmental action in general and in different domains (Hakhverdian, 2012; Soroka & Wlezien, 2010b; Stimson, MacKuen, & Erikson, 1994; Vandeweerdt, Kerremans, & Cohn, 2016).

There are also some results on environmental policy: Weaver (2008) concludes that public opinion has both direct and indirect (through protest behaviour) effect on environmental policy making. Agnone (2007) makes similar conclusion when he finds evidence for an amplification mechanism between public opinion and protest behaviour of environmental movements (public opinion affects policy making also directly). Johnson and colleagues (2005) find support for the thermostat model of representation (see below), while adding influence of environmental conditions. Even though there is a wealth of literature on policy responsiveness in general on one hand and what determines and drives policy attitudes on the other (see chapter 4), little has been done to explore how, if at all, public attitudes toward climate policies influence policy making in this domain. Moreover, most of the existing studies were conducted in the US and this geographical constraint further limits the possibilities to generalise the existing results.

Despite the wealth of literature, when Burstein summarized existing research in 2003 he concluded the field has developed in volume, but not in theoretical background: "it may be argued that the range of predictions about impact [of public opinion] based on democratic theory has widened in the past 20 years, not narrowed, and that researchers are not closer to consensus now than they were then" (p. 30). Although another ten years have passed since Burstein's evaluation, not much has changed. Apparently, public opinion has sometimes some impact (Burstein, 2010; Manza & Cook, 2002), which is not by itself a very convincing conclusion. Burstein (2003), on one hand, concludes that public opinion has a significant impact on policy in three-quarters of studies he reviewed. On the other hand, Gilens and Page (2014) make a compelling empirical case for dismissing the majoritarian theory of democracy in the US in favour of economic-elite domination and biased pluralism. Krosnick and MacInnis (2013) support this conclusion with results of public opinion polls consistently showing positive evaluations of governmental action on climate change. Yet, this general public consensus remains largely ignored by the U.S. administration (also Brewer, 2004).

³ Bartels (2003) argues that citizens do not have preferences, but attitudes, since the key axioms of preferences are rebutted by an abundance of empirical research (see also Section 3.2.4).

Furthermore, it is far from clear how much impact does public opinion have and what exactly is the nature of its relationship with public policy in terms of causality (Burstein, 2003; Hobolt & Klemmensen, 2005; Manza & Cook, 2002; Page, 1994). These questions and the long-lasting inability to answer them indicate there might be some fundamental problems in the field. Several more points were raised in the debate. Vanderweerd and colleagues (2016) provide a good summary of critical points when they argue that representation can occur only if the public sufficiently understands the issue and has stable attitudes about it, if the issue is salient and important enough, and if there is a clear majority preference for action or one option in the overall opinion. These are restrictive conditions of which only few can be attained and only sometimes (for example individual attitudes are regarded as unstable, although their aggregation results in stable overall trends). Furthermore, the whole idea of policy representation is put into question by the issue of elite and media manipulation of public opinion (Burstein, 2003).

Addressing at least some of the conditions laid out by Vanderweerd and colleagues (2016), saliency indeed plays a significant role in policy responsiveness to public opinion (Burstein, 2003) and as Page (2002) points out, most of the research on policy responsiveness has been done on high-salient issues. The effects of public opinion on policy are therefore probably overestimated and the space for interest groups and other stakeholders is large. Burstein (2006) agrees, but adds that on non-salient issues, citizens are not likely to have clear opinions because they just do not care so much and they leave the decision to other actors, while it does not necessarily mean that public lost against interest groups. Moreover, public opinion has been shown to have effect both independently on other actors or collective behaviour and through them (Burstein & Linton, 2002; Vandeweerd et al., 2016; Weaver, 2008). Agnone (2007) provides evidence for an amplification mechanism between public opinion and protest behaviour of environmental movements, while polled “public opinion” still has an independent effect when issue salience is increased by protest.

Second, the issue of causality is a difficult one to untangle. As Bachner and Hill (2014) point out, additional enquiry is needed to identify causal chains and directions in the relationship of public opinion and public policy. Correlations are present, but which one is the stimulus and which is the response? Many authors and theoretical models argue that the relationship is more an interaction in both directions than one-way influence (e.g. Hoff-Elmari et al., 2014; Mullinix, 2011 for overview). For example the thermostatic model of policy responsiveness formulated by Soroka and Wlezien (Soroka & Wlezien, 2010a, 2010b) is focused on relative preferences, which represent the difference between actual spending in different policy domains and public’s preferred level of it (see e.g. Bendz, 2015; M. Johnson, Brace, & Arceneaux, 2005; Soroka & Wlezien, 2010a, 2010b for application of the model). Using relative preferences assumes reciprocal relationship between policy and public opinion – if public opinion changes, policy follows in response. If spending increases or decreases, relative preferences change accordingly to match the current situation.

Hoff-Elmari and colleagues (2014) furthermore argue that the relationship should be thought of as a system of feedback loops, “comprising both a dynamic policy representation and a dynamic public responsiveness” (p. 23). The responsiveness of public in their perspective, however, is not limited to adjusting relative policy preferences or giving positive or negative electoral incentives, but involves also normative responses and changes in values, behaviours, and beliefs.

Price and Roberts (1987) propose a theoretical approach to public opinion that could help to overcome some of the aforementioned problems. In their view, public opinion is not a public's "state of mind" that could be accurately measured by polls, but the "public's issue specific "state of social organisation" (Price & Roberts, 1987, p. 804). This perspective shifts attention to the means of social organisation around specific issues, rather than causal links between polls and policy decisions. Examining social organisation around issues can lend some insight on when and how the public opinion process gains political relevance and force through the whole process, that is with a more holistic and contextualised perspective identifying what actors play key roles in the issue-specific organisation and communication processes, what communication strategies are used and how, what is the distribution of power and access to communication channels, etc.

As mentioned above, elite and media manipulation is often argued to question the assumption that policy makers are responsive to public opinion – they may follow what masses think only to formulate strategies how to manipulate them and to monitor how successful they were. Page (1994) provides a somewhat gloomy commentary: "U.S. government policy responds democratically about one-third of the time; it ignores public opinion and goes in the opposite direction about another third of the time; and, in the remaining third of cases, public opinion is 'prepared' or manipulated by officials and other elites so as to be made congruent with policies that are pursued for other reasons" (pp. 28-29). As this is not an account of empirical results, it is somewhat simplifying, although getting to the point. As argued above, the causality is not straightforward in any single direction. Rather, public opinion is a continuous communication and social organisation of actors with diverse interests. It would be very simplistic to think that public opinion is entirely "created" by elites and media. It would be equally simplistic to think that elites do not try to influence public opinion.

Contingency of policy attitudes and public preferences on political messages (Druckman, 2014) is, to a degree, inevitable and inherent to the opinion-policy communication processes. By strict measures, increasing policy acceptability by policy formulation is a form of influence, even manipulation, of public opinion, while it is an often-provided reason for conducting studies of policy attitudes. These studies, by their own right, thus constitute a feedback loop between public opinion and policy formulation (i.e., they constitute a part of the perceived "public opinion"). Therefore, there is no point in holding simplistic views of unidirectional causality or to dismiss influence of public opinion on policy on the grounds of elite manipulation (or in general). According to Crespi (2013), public opinion is a continual and "interactive system and not a sequence of causally linked stages of development" (p. 2), while it is a communicative system of plurality of actors and levels of communication. In consequence, it may be pointless to try to identify causal mechanisms per se. Rather, researchers should focus on interaction of different actors and communication processes through which both public opinion and public decisions emerge.

2.3. Informed public and its will

Other major criticism of the proposition that public opinion influences policy making concerns ill-informed citizens. Bogart (1967, p. 337), for example, is very sceptical toward public opinion polls and citizens' knowledge: "Perhaps the most important and accurate thing that surveys can tell us is the extent of public ignorance on matters of fact." To be responsive, to voice meaningful opinions, and to hold the government accountable for its actions, citizens need to be attentive of those actions and decisions and knowledgeable about their context and consequences at least for themselves. Hence, the more information the public has, the better for democracy. Ill-informed citizens, on the other hand, cause concerns whether the public is competent enough to contribute in any way to policy decision making (otherwise than by voting) and whether it can have any (sound) opinions at all.

Yet, public can also be accepted as it is – ill-informed for the greater part. One can regard this state as Althaus (2006) suggests it was regarded for most of the history – as "given", rather than a "crisis" (p. 91). There is no universal expectation of citizens to be informed on every issue (or even most of them) discussed in the public domain in the "classical" democratic theory (Althaus, 2006). As a matter of fact, policy making is the only domain where citizens are expected to be experts or at least to be universally knowledgeable (Soroka & Wlezien, 2010b). In any other field outside their own job, they are discouraged from making their own conclusions (Ramonet, 2003).

The centrality of knowledge and information in this debate originates in the rationalism of the Enlightenment period – not being knowledgeable equals not being free (Ramonet, 2003). Consequently, the increase in communication and the coming of information era have been regarded mostly as positive in this respect. There is, however, also a reverse side to this – the unprecedented growth of information not only provided to people, but literally loaded on people in a constant information overload, has been also identified as a threat to democracy (Sartori, 1993). Sartori (1993) even suggests that political apathy of citizens is not a consequence of too little information or education, but rather of too much of it. The unstopping information flow numbs people, making their attention highly selective.

Moreover, not all citizens have to hold opinions on all issues. Citizens are more likely to give reasoned opinions on more salient issues (see above) and issues they are more interested in (Ciuk & Yost, 2016). This interest is probably differentiated in the public – while some groups will not be interested at all, some will form an *issue public* concerned about particular issue and even exerting pressure on policy makers (Nisbet, 2011). Sartori (1993) argues that having a partially uninterested public is a good thing – with formulation of opinions, citizens tend to incline to extremes. Without a group of indifferent voters in the middle, extreme political parties would regularly gain more support and pose a threat to democracy. Soroka and Wlezien (2010b) also argue it is enough to have some non-trivial number of respondents to hold and express opinions⁴. This line of argumentation, however, raises some concerns about representation – only part of the public gets represented. Such concerns were in fact present in the sociological critique of public opinion and are partly the reason why political sociology has been omitting public opinion for the most part of the past decades (Burstein, 1998; Manza & Brooks, 2012; Perrin & McFarland, 2011).

⁴ To follow their argument, an assumption can be made that citizens may adopt opinions from their peers, authorities and opinion leaders, thus not being informed themselves, yet having an opinion of which they are fairly convinced of.

During the 60s and 70s, sociology was focused mostly on macrostructural features of society and for the greater part rejected functionalist paradigm. As a result, public opinion research was criticized as “insufficiently sociological” (Perrin & McFarland, 2011, p. 93), since it ignores power relations and inequalities inherent to societies. Peoples’ voices are not all equally influential – some matter more than others. Key figures in the field, like Herbert Blumer or Pierre Bourdieu, criticized the whole idea that there actually is public opinion or a single public voice (see Perrin & McFarland, 2011 for summary of the debate). If this was the case, polling would rather create public opinion than measure it. Two major critiques were raised – one that public opinion as measured by polls is a mere construction (epistemological validity) and second, that what is measured does not represent what people actually think (ontological validity). Both assumptions thus criticized are also challenged by effects of framing and question wording, halo effects of questions, nonresponse or responses to fictional questions.

Different remedies for citizens providing answers to survey questions they do not know much about were proposed in the literature: from attempts to provide respondents (and citizens) with more information or arguing that citizens are able to reach meaningful opinion with use of shortcuts and heuristics (e.g., Rugeley & Gerlach, 2012), through using “Don’t know” or “No opinion” response options (Althaus, 2003), attention checks (Huang, Curran, Keeney, Poposki, & DeShon, 2012; Meade & Craig, 2012), question filters, measures of opinion intensity etc. (see Althaus, 2003; Price & Neijens, 1997 for a short overview) to aggregation of attitudes (Erikson, 2007; Page & Shapiro, 2010). Yet, no such methodological remedy refutes the main points of criticism with respect to epistemological and ontological validity of public opinion.

Should we thus abandon our endeavour in understanding of what citizens think? Or should we even agree with Bourdieu that there is no public opinion at all? I argue not. Public opinion as perceived through polls and surveys is indeed a construction, but a construction created by researchers together with the public. I agree with Perrin and McFarland (2011) that “citizens, confronted with the results of polls or the requests of interviewers, imagine themselves as part of a public that is brought into being by the very polls themselves” (p.101). If one was to say that public opinion does not exist, one omits an important group of wilful actors – citizens themselves. Citizens are inevitably part of public opinion creation by participating in surveys and by thinking about the results presented to them. They can believe that polls give them certain power or means, next to their other options, to exert pressure on government, either to hold it accountable or to emphasize issues they think are important. To put it with Nisbet (2011): “[I]nstead of reducing public opinion formation to the aggregation of individual responses in nationally representative surveys, public opinion needs to be studied, understood, and discussed as a process that emerges from social context, interaction, and communication. It is this complex process that accounts for the difference between expert views and the subjective perceptions of a diversity of publics” (p. 356).

2.4. Conclusion

In a restricted sense of the term, public opinion has been established as citizens' answers to surveys and polls and as such it influences other actors' (including interest groups, NGO's, social movements, and policy makers) decisions and actions. As a mediated representation of public response, public opinion in this sense is a crucial part of a broader public opinion process, contributing to perception of "public opinion" and information to political actors. In this sense, public opinion has become an institutional reality, "an institutional component of the very political process it seeks to understand" (Price & Roberts, 1987, p. 787).

Survey results undeniably serve for purposes of power struggles (Manza & Brooks, 2012). Rather than ignore or dismiss it, we should accept that there is an information (and power) tool which can be, and often is, used in policy making in both early stages of problem identification and in its evaluative stages. Despite it being a tool far from ideal, representing public views only partially, it will not be abandoned any time soon.

What we do not have to accept, and even cannot, as given, is how are public responses measured, explored, and interpreted. Those are the areas we should always work on and develop. "A question asked by an interviewer changes an abstract and perhaps irrelevant matter into a genuine subject of action; [...]. The conventional poll forces expression into predetermined channels, by presenting clear-cut and mutually exclusive choices. To accommodate one's thoughts to these channels represents for the respondent an arousal of interest, an affirmative act" (Bogart, 1967, p. 335). Representations of public opinion, i.e., perceived public opinion, are simultaneously co-constructed and represented by our measurements and instruments (Perrin & McFarland, 2011). Hence, researchers should ask difficult and maybe uncomfortable questions about their work and research practices. Part of this task is to examine carefully the measures we use in our research.

What I think follows this argumentation is a reconceptualisation of how results of policy acceptability or policy support studies are interpreted. First, if researchers are to examine public opinion in order to elicit values and identify policy problems needing attention, respondents should be given space to formulate their views in more proactive way rather than responding to issues selected by researchers or policy makers (Althaus, 2003). This requirement certainly calls for new techniques, data collection methods, and use of multiple research methods (Page, 1994).

Second, if we want to explore policy-specific attitudes and their implications for policy making or possible reactions of citizens to proposed and implemented policies, we should do it in terms of readiness or potential for acceptance or support, rather than actual acceptance or support. The word *acceptability* in fact hints to this potential – the ability to accept. Instead of claiming that there is overall support for climate policies, researchers should claim that there is high potential for policy support. Such interpretation weakens our conclusions, but more importantly, it weakens the assumptions we need to make similar claims about the public. Public opinion on policies has been accused to be fickle and dependent on measurement and framing (see below). People are willing to give opinions on policies they do not know or understand, on non-existent or very obscure issues (Moy, 2008). Moreover, general measures of what is often termed *policy preferences*, i.e., selection of most important problem or issue facing the country, or preferences for public spending, have been shown to measure different things (Jennings & Wlezien, 2015). Similarly, measures of policy acceptability and support may also result in answers that are not even related (see Study 1 in

chapter 3). Such results lend support to the criticisms of public opinion research summed above.

Moreover, given all the problems with measurement mentioned above, it is hard to establish when there is enough support or acceptability for a policy to be “safe to implement”. But there is no “popularity threshold” (Pawson & Wong, 2013, p. 446) or a green light, rather it is a matter of conditions. As Pawson and Wong (2013) state, best evidence researches can offer to policy makers is a proposition of when a certain policy is more likely to be supported and what elements need to be in place.

Hence, instead of assuming citizens to be opinionated on policies, we should explore what potential they have to form a positive opinion on policy once it is proposed and the public provided with more information about it. The slight shift in the perspective would allow avoiding such pitfalls like debating whether people can have policy-specific preferences or rather preferences for the degree or contours of governmental activity in general (see above; Stimson et al., 1994; Wlezien, 2004) by simply acknowledging that people do not have preferences at all (Bartels, 2003). Instead, they are more or less likely to develop policy-specific opinions (or context dependent preferences – see section 3.1) if presented with the real deal. We can try to gauge this potential by measuring its valence, i.e., whether people evaluate the specific policy in positive or negative terms, and strength, i.e., to what degree they feel convinced about the evaluation or attitude. The idea of readiness to form an opinion, rather than having a formed opinion, could also help us to take a better grasp of the framing effects and all the considerable changes in respondents’ answers that question the existence of public opinion as such.

3. Methodological assessment of analysing policy attitudes and acceptability

3.1. Literature review

A systematic literature review of studies examining factors related to public responses to climate change mitigation policies was conducted with the aim of reviewing possible instruments used in the current research practice to measure public policy attitudes. The goal is to provide research agenda in terms of methods of measurement, as well as in terms of explanatory factors, and to inform a construction of a common theoretical framework based on a narrative synthesis of empirical results (Mays, Pope, & Popay, 2005; Torraco, 2005).

The review has two parts. All studies found in the systematic search described below were used in the preliminary phases of the literature review to scan the scope of the research, methods, approaches, and theoretical background, as well as concepts, operational definitions, and measurement of key constructs as discussed in previous chapters.

Only certain studies were selected for the second part, i.e., discussion of relevant explanatory factors. These were studies using general or composite measures and studies focusing on taxes as a specific domain of climate policy (see Table 2)⁵. The purpose of narrowing the focus to a single domain of policy instruments is to provide more detailed and contextually based synthesis of the results. Reviewing studies of attitudes to mitigation policies in general, on the other hand, provides a comparative material with a general focus.

The complete review includes empirical studies of general publics in Europe, North America, and Australia⁶ published since 2000 until the beginning of 2017 (few highly relevant studies published from 1997 to 2000 were also included). There was also no limitation on what research methods were used. No further specification of the policy domain other than climate change mitigation and GHG emissions reduction policy was required (only studies considering environmental effects were considered relevant in the case of road pricing policies). Papers focusing on green electricity, biofuels, green technologies etc. were considered as relevant if they contained a formulation of GHG emission reduction policy. Studies targeting stakeholders (e.g., companies and politicians) were excluded from the search.

Several academic databases (Academic Search Complete, Political Science Complete, EconLit, SocIndex, and Environment Complete in EBSCO; CBCA Complete, OxResearch, ProQuest Biology, Psychology, Science, and Social Science Journals, ProQuest Research Library, and Environmental Sciences and Pollution Management in ProQuest; ScienceDirect, and Scopus databases, Web of Science databases and ebrary for books) were searched for the terms *policy*, *acceptability*, *acceptance*, or *support*. In some databases, where the search query returned too many records, it was narrowed by other terms (*climate*, *public*, *social*) or rules (excluding news articles, limiting sources to books, conference papers and proceedings, working papers and reports, and excluding topics like medicine, health and business, or by limiting the search for the terms in abstracts). The search was not limited on scientific databases or peer-reviewed journals.

⁵ Many studies analysed attitudes toward several instruments including taxes. These studies are also included in the selection.

⁶ The decision to narrow the geographical scope of the review was made in consideration of possible language bias in reviewing studies from other parts of the world and comparability of economic and political situation of the countries.

The search was performed repeatedly and iteratively from January 2013. New studies published since this date were successively added in following searches with the last one conducted in April 2017. Over 300 abstracts were downloaded and screened. 164 relevant records were selected, including some working papers and other “grey” research outputs.

The search process as described here may not be replicable (a common requirement for systematic reviews), since a large amount of studies was obtained through bibliographies and citation records. Nevertheless, given the diversity of the field in terms of methods, approaches, policies, terms, and concepts, the search needed to be particularly extensive and a pragmatic use of a variety of methods and searches (Greener & Greve, 2014) was seen as more suitable in this case. Given the comprehensiveness of the search, reviewed studies represent the field as defined by the criteria on geography, language, and policy focus well and with high reliability.

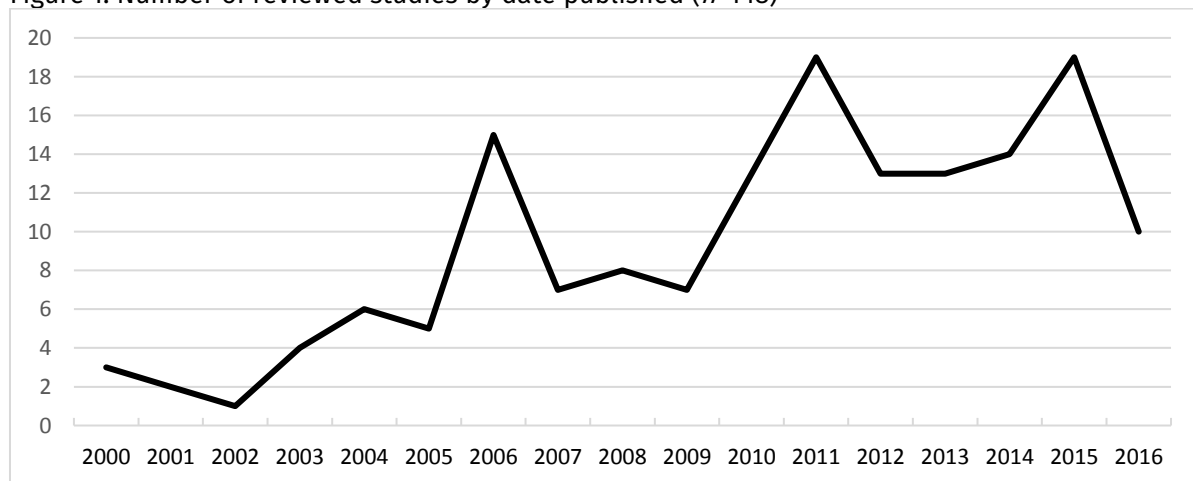
Overview of studies

The 164 studies fall into 5 broad categories based on their disciplinary approach and theoretical background (see Table 1). Most of the studies (76) are analyses of public opinion and academic surveys using mostly *ad hoc* models. Another large group (48 studies) are studies with background in utility theory, using stated preference methods (2 studies use revealed preference methods). 21 studies use social psychological models (19) or cultural theory (2). The theoretical backgrounds of these three groups are discussed in the following section of this chapter. The studies in these groups are quantitative (occasionally including complementary qualitative research or pilot study). 16 studies in the review use solely qualitative methods.

The amount of literature on attitudes toward climate change mitigation policies is growing, as evidenced by the increase of published studies in the last 15 years (see

Figure 1; there was a special journal issue on environmental tax reform in 2006, resulting in the noticeable peak in published studies). The increasing trend may be a result of higher demand for policy relevant research, better coverage of published work by academic databases, and the emergence of new data collection methods in recent years. Most of the studies using computer assisted web surveys (CAWI) were published from 2010 (only 4 before and not until 2005), while last years have brought such devices as Amazon *Mechanical Turk*, a survey tool for the U.S. population based mostly on convenience samples.

Figure 1: Number of reviewed studies by date published ($n=148$)



Note: Studies published in 2017 so far are not included in the figure ($n=5$)

Although arguments have been made that *Mechanical Turk* populations represent the general public reasonably well (Buhrmester, Kwang, & Gosling, 2011) and are a valuable tool when used with caution (Berinsky, Huber, & Lenz, 2012; Goodman, Cryder, & Cheema, 2013), the samples obtained by this service are treated as convenience samples in the review, and therefore as not reliably representative of the general public. Convenience samples or samples representing only certain subpopulations (for example inhabitants of specific region, car owners etc.) were analysed in most studies (100 studies in total). Only 60 studies use samples representative of the public, with 24 studies not providing additional information on sampling, another 37 using panel based samples (of which 24 do not provide information on selection of respondents either to the panel or from the panel to the sample). 13 studies used random digit dialling and only 16 studies collected representative samples created by random, stratified, multistage, or quota sampling. 13 studies in total did not provide any information about sampling.

Majority of studies examines samples of the U.S. public. Other surveyed countries include the UK, Sweden, Australia, Canada, Netherlands, Switzerland, Germany, and Norway. Central and East European countries are included only rarely, mostly in cross-national surveys (7 in total). Some countries outside the focus of this dissertation, namely China, Taiwan, and Japan, are also represented – these were comparative studies examining samples from Europe or the US in comparison with samples from Asia.

Table 1: Summary (frequencies) of studies in the review – study characteristics

	all	selected		n =	164	95
Group			Survey method			
Economic	48	15	CAPI	3	2	
Social psychological	21	13	CATI	14	7	
Public opinion	76	52	CAWI	68	34	
Referenda	3	3	CASI	1	1	
Qualitative	16	12	PAPI postal	30	19	
Sample			PAPI self-administered	15	9	
representative (general public)	60	35	PAPI face-to-face	11	6	
not representative (general public)	30	26	focus groups	7	3	
convenience or subpopulations	71	31	interviews (qualitative)	5	5	
referendum	3	3	other	5	4	
Sampling			Sample size			
random, stratified or multistage random	10	5	less than 200	32	22	
quota	6	2	201 to 500	32	17	
random digit dialling, random address	13	5	501 – 1000	35	19	
not specified representative	24	15	1001 – 5000	48	28	
panel	37	13	5001 and more	8	3	
referendum	3	3	referendum	3	3	
non-probability	55	36	not specified	6	3	
not specified	13	11				

Note: The numbers may occasionally total in higher sums, since individual studies may use multiple samples or methods.

The studies cover a broad diversity of policies on different levels of governance, in different sectors of economy, and with different policy instruments (see Table 2 for overview). Most of the studies examine attitudes toward specific policies either by single item (56 studies) or composite (11) measures, or by contingent valuation specifying the policy attributes (45, of which 31 compute values of willingness to pay). 51 studies explore attitudes toward mitigation policies in general. Most of the examined policies and policy proposals are

formulated on national level (96 studies), in transport (52), energy (16), or residential (19) sectors of economy. 26 studies consider policies economy-wide impact. In terms of specific instruments, taxes are studied by far the most often (predominantly levied on fuel). The prevalence of taxes is partly a result of contingent valuation studies, which often use taxes as a payment vehicle in their design. Therefore, many such studies do not estimate WTP for taxes or tax-based instruments *per se*, but rather a willingness to pay taxes for some other policy instrument. Nevertheless, willingness to pay taxes is likely to reflect attitude both to the instrument at hand and to the payment vehicle.

Table 2: Summary (frequencies) of studies in the review – **policy characteristics**

all				selected		n =		164	95
Measurement				Policy instrument					
Policy specific	single item(s)	56	30	taxes	taxes directly applied to the pollution source (Carbon Tax)	6	6		
	composite measure	11	4		taxes on inputs or outputs of a production process	37	36		
General	single item(s)	20	19		negative tax for environmentally-friendly activities	14	13		
	composite measure	31	30		not specified	7	8		
Contingent valuation		45	13		road pricing		11	2	
Level of governance				liability	sanctions	1	0		
national		96	65	ETS	cap-and-trade	13	7		
EU		10	7		not specified	4	1		
regional (US states, regions)		6	3						
local		9	1	command and control	prohibition or mandating of certain products or practices	3	3		
global or international		12	3		performance standards	9	4		
not specified or general		29	13		technology standards	6	2		
					not specified	3	1		
Sectors of economy				technology support	public and private RD&D funding	6	3		
residential		19	15		financial measures (subsidies)	5	3		
transport		50	29		renewable portfolio standard	3	2		
energy		14	5		feed-in tariffs	1	0		
industrial and business		6	3		not specified	3	2		
economy-wide		24	8						
other		3	0	information tools	campaigns	3	3		
mix		29	25		education	1	1		
not specified or general		37	25		not specified	1	1		
Existing policy				emission reduction target		2	0		
				international agreement		4	0		
				mix		33	0		
				not specified or general		38	23		

Note: The numbers may occasionally total in higher sums, since individual studies may use multiple samples or methods. Policy categories are based on categorisation prepared within the CECILIA2050 project (Zvěřinová et al. 2013).

3.2. Concepts and operational definitions

Assessing the validity of what is measured in quantitative research requires knowledge of what is to be measured, which is usually stated as a definition of a concept then translated through process of operationalisation to a set of indicators. These are, or should be, the first steps of any research in any field of social sciences. However, a more profound debate on definitions and operationalisations and their importance within the field of attitudes toward environmental policies has begun only recently (Batel, Devine-Wright, & Tangeland, 2013; Daniels, Krosnick, Tichy, & Tompson, 2012; Dreyer, Teisl, & McCoy, 2015; Dreyer & Walker, 2013; Schaffrin, 2015). So far, the debate only hinted on possible problems of the field, while research results suffering these problems are still produced by researchers in the field.

In this section, different measures and constructs, as well as related theoretical considerations used in surveys of public responses to mitigation policies are overviewed. Issues of measurement and operationalisation are discussed in order to inform both the construction of measures of policy attitudes in the future and interpretation of existing results. The first part of this section overviews existing measures of policy attitudes in political science, social psychology, and sociology. The review provides a starting point for identification and analysis of concepts used in research and their embedding in broader concepts of attitudes, behaviours, concerns, and others (subsection 3.2.2). The third part considers the conceptualisation of policy attitudes and responses in relation to the nature of the evaluated entity as a general or a specific policy object. Finally, the concept of policy preferences is overviewed to complement the previous discussion. An empirical study of two composite measures of environmental policy responses is presented in the following section (3.3) as an empirical supplement providing further evidence to the conclusions resulting from the literature review.

3.2.1. Overview of survey measures

There is a great diversity in what measures are used to capture policy attitudes and in the terms describing these attitudes, measures, and concepts (see Table 3). In most of the studies reviewed in this text, any definition of used concepts is rarely given, although most use the terms *policy acceptability*, *acceptance*, *support*, or *policy preferences* to describe the presented results. 75 studies from the literature review provide information on survey items measuring policy attitudes. Table 3 summarizes the main categories⁷ of measures used in the reviewed studies based on their wording (see Table 43 in Appendix for the complete overview including survey items and further information on measurement). Hardly any two studies use the same measure (usually they do only if using the same dataset), i.e., its wording, the number of points on a response scale, inclusion of the middle point, *don't know* option, polarity of the scale, and the number of items used.

⁷ The categories are based on wordings of the questions and response categories as reported in the reviewed studies. They are auxiliary and may not necessarily overlap with the underlying concepts they measure. Items in several categories may be indicators of the same construct and items within one category may tap different constructs at the same time.

Table 3: Summary of measures used in research of policy responses based on their wording

Category of measure (based on question wording)	Example		
	Question	Response categories	Source
Support (>opposition)	<i>To what extent do you oppose or support setting caps on emissions of greenhouse gases and forcing companies that exceed the cap to pay other companies or the government, even if this increases costs to consumers?</i>	1 = strongly oppose, 7 = strongly support	(Carrico, Truelove, Vandenberg, & Dana, 2015)
	<i>A number of policy options have been proposed to deal with the problem of Global Warming and Climate Change. I am going to read a number of policy options to you. For each policy option, please indicate whether you: ...</i>	... strongly support, support, oppose, or strongly oppose that policy.	(Bies, Lee, Lindsey, Stoutenborough, & Vedlitz, 2013)
	(Bies et al., 2013; Bolsen, Leeper, & Shapiro, 2014; Carrico et al., 2015; Ding, Maibach, Zhao, Roser-Renouf, & Leiserowitz, 2011; Jang, 2013; Kaplowitz & McCright, 2015; Leiserowitz, 2006; Lubell, Zahran, & Vedlitz, 2007; Rhodes, Axsen, & Jaccard, 2014; Rickard, Yang, & Schuldt, 2016; Severson & Coleman, 2015; Smith & Leiserowitz, 2014; Stoutenborough, Vedlitz, & Liu, 2015; Wallace, Irvine, Wright, & Fleming, 2010; Yang, Rickard, Harrison, & Seo, 2014; Yang, Seo, Rickard, & Harrison, 2015)		
Support (>lack of support)	no question wording provided	binary: <i>yes / no</i>	(Attari et al., 2009)
	(Dreyer & Walker, 2013)		
Probability or likelihood to support	no question wording provided	very unlikely to very likely definitely yes, probably yes, probably no, definitely no	(T. Dietz, Dan, & Shwom, 2007; Lu & Schuldt, 2015)
	(T. Dietz et al., 2007; Lu & Schuldt, 2015; Shwom, Bidwell, Dan, & Dietz, 2010; Shwom, Dan, & Dietz, 2008)		
Acceptability	<i>How acceptable do you find the fuel economy standards?</i>	completely unacceptable” to “completely acceptable.”	(Dreyer et al., 2015)
	(Carattini & Baranzini, 2014; de Groot & Schuitema, 2012; Gatersleben, 2001; Steg, De Groot, Dreijerink, Abrahamse, & Siero, 2011; Steg, Dreijerink, & Abrahamse, 2005; Tobler, Visschers, & Siegrist, 2012)		
Agreement with policy	<i>To what extent do you agree with the policy of putting a price on carbon?</i>	1 (Strongly disagree) to 5 (Strongly agree)	(Unsworth & Fielding, 2014)
Agreement with statement	<i>How much do you agree with each of the following statements about how to address global climate change?</i>	1 (strongly disagree) to 7 (strongly agree)	(Hart, 2011)
	<i>I would be willing to pay higher taxes to reduce global warming</i>	1 = strongly disagree to 7 = strongly agree	(Joireman & Liu, 2014)
	(Hart, 2011; Hart & Nisbet, 2011; Jang, 2013; Joireman & Liu, 2014; Lockwood, 2011; Poortinga, Steg, & Vlek, 2002, 2004; Unsworth & Fielding, 2014)		
In favour (>oppose, against)	<i>Next, I am going to read some specific proposals. For each one please say whether you generally favor or oppose it:</i>	binary: <i>In favor / oppose</i>	(McCright, Dunlap, & Xiao, 2013)
	(Bernauer & McGrath, 2016; Hsu, Walters, & Purgas, 2008; Krosnick & MacInnis, 2013; McCright, 2008; Pietsch & McAllister, 2010)		

Table 3 *continuing*

Willingness to sacrifice	<i>How willing are you to bear some of the costs resulting from the fuel economy standards? How willing are you to take action to voice a positive opinion about the fuel economy standards, such as writing a letter or calling a representative?</i>	not reported (5-point scale)	(Dreyer et al., 2015)
Evaluation	<i>One important reason for the climate change that has been observed during the last couple of years is considered to be carbon dioxide (CO₂) emissions from motor transport among other sources. What is your opinion of the following proposal to limit carbon dioxide emissions in Sweden?</i> (Harring & Jagers, 2013; Jagers & Hammar, 2009)	=1 if proposal is very good or good, =0 if proposal is neither good nor bad, bad or very bad	(Hammar & Jagers, 2006)
Approval	<i>On balance, would you approve or disapprove of government policies that encourage the production of biofuels from the following types of plant matter?</i>	“Strongly Disapprove” at 1 to “Strongly Approve” at 7	(Dragojlovic & Einsiedel, 2015)
Referendum	<i>If you could vote on each of these agreements in a referendum, how likely is it that you would vote in favor or against each of the agreements? Please give your answer on the following scale from definitely against (1) to definitely in favor (10).</i>	1= vote definitely against; 10=vote definitely in favor	(Bechtel & Scheve, 2013)
	<i>In the following you will find the same list of actions that might be taken to reduce or stop climate change. Would you vote for each of these actions in a national referendum?</i>	1=Definitely No, 2=Probably No, 3=Don't know, 4=Probably Yes, and 5= Definitely Yes	(Bostrom et al., 2012)
	(Bechtel & Scheve, 2013; Bord, O'Connor, & Fisher, 2000; Bostrom et al., 2012; Hammar & Jagers, 2007; Jagers & Hammar, 2009; Kallbekken & Sælen, 2011; O'Connor, Bord, Yarnal, & Wiefek, 2002; Rosentrater et al., 2013)		
Other	(Allen & Chatterton, 2013; Bernauer & McGrath, 2016; de Groot & Steg, 2006; Hurlstone, Lewandowsky, Newell, & Sewell, 2014; Löfgren & Nordblom, 2009; Lu & Schuldt, 2016; McCright, Dunlap, & Marquart-Pyatt, 2016)		

Note: The category of referendum measures is distinguished by the framing of taking a vote, although wording similar to other category may be used in the response (voting in favour or against).

Measures are usually designed as an indication of answers either on unipolar (acceptability, likelihood of support, willingness to accept) or bipolar (support-oppose, agree-disagree, in favour-against) scales or categories of answers. Measures in terms of support, favour, acceptability, or agreement with policy-related statements are predominant. Referendum questions are also popular and quite diverse by themselves in terms of response format and wording. Some offered several policy alternatives (Kallbekken & Sælen, 2011), some a binary choice between yes and no (Hammar & Jagers, 2007), and some a Likert-type scale with various numbers of points (e.g., Bechtel & Scheve, 2013; Bostrom et al., 2012; O'Connor et al., 2002).

Several different and quite rare measures are subsumed in the category of “Other” in Table 3. Recent study by Lu and Schuldt (2016) employs a single item measure of general opinion about how much should government do about climate change (from nothing at all to everything they can on a 10-point scale). Löfgren and Nordblom (2009) ask respondents whether a CO₂ tax should be increased or decreased, and McCright and colleagues (2016) use a measure from Eurobarometer surveys inquiring whether the EU emissions reduction goals and shares of renewables are too modest, about right, or too ambitious.

Studies using several measures of policy attitudes at once⁸ are a useful source of information about underlying concepts and their manifestation through different survey measures. Results of several such studies support the notion of one underlying concept manifesting rather consistently through diversity of measures. Kachi, Bernauer, and Gampfer (2015) and Schmöcker and Petterson (2012) use different items to tap the same underlying concept of acceptability of climate policy in general and environmental tax focused on emission reductions respectively. Both studies construct indexes from a variety of items with high level of internal consistency (Cronbach's α between 0.84 and 0.96 depending on index and national sample). Kachi, Bernauer, and Gampfer (2015) also identify one factor in factor analysis of their five items used to construct an index, although operationally they distinguish three types of indicators measuring attitude, behavioural intention, and willingness to pay. Jagers and Hammar (2009) use two very similar policy formulations in two different concepts – evaluation whether the proposed policies (increase of the CO₂ tax on petrol and expansion of public transport) are good or bad suggestions and a referendum question inquiring whether respondents would vote in favour of or against these policies. The two surveys were conducted several years apart, thus lowering comparability. Nevertheless, the results are very close (19% of Swedes considered increased CO₂ tax to be a very or a rather good suggestion, while 20% would vote in favour of it).

Only two studies directly compared different measures of attitudes to the same policy. Results of both these studies, contrary to the indirect evidence referred to in the previous paragraph, indicate important differences between measures. Dreyer and Walker (2013) asked Australians how acceptable they find the Clean Energy Legislative Package (responding on 5-point Likert-type scale from completely unacceptable to completely acceptable) and whether they support this policy (binary response yes or no). The authors were according to their own account surprised to learn that responses to these two questions have different predictors. Such result suggests the two questions tap into different concepts. Hence, Dreyer, Teisl, and McCoy (2015) employed two different composite measures: acceptance and support. Acceptance was measured by multiple items with different notions: acceptability, be in favour or against the proposal, agreeing or disagreeing with it, and preferring the implementation of the policy as opposed to not implementing it. Support was a composite of 7 items measuring how supportive the respondents are of the policy proposal, how willing they would be to bear the costs or to take actions, and how likely they would be to voice positive opinion about the proposal to family, co-workers, on social media, or in newspaper (by letter). The indexes, computed as averages of the listed items, had high levels of internal consistency as measured by Cronbach's α (0.91 and 0.84 respectively) and yielded different results. Acceptance was overly higher compared to support (86% over 66%). Regression analyses with the indexes as dependent variables and perceived fairness and effectiveness of policies and free market ideology views held by the respondents as explanatory factors showed some, although not substantial, differences.

The study by Dreyer, Teisl, and McCoy (2015) suffers a weakness in design, since responses to both sets of questions were obtained from the same respondents. Since respondents usually want to be consistent, the answers to these items placed in the same questionnaire can converge. Larger differences could manifest in a split-sample design. Or alternatively,

⁸ (Bernauer & McGrath, 2016; Chaudoin, Smith, & Urpelainen, 2014; Dreyer, Teisl, & McCoy, 2015; Dreyer & Walker, 2013; Jagers & Hammar, 2009; Jagers, Löfgren, & Strippel, 2010; Jang, 2013; Kachi, Bernauer, & Gampfer, 2015; S. Y. Kim & Wolinsky-Nahmias, 2014; Schmöcker, Pettersson, & Fujii, 2012)

respondents could have differentiated their answers to these questions because they could compare them. Reading multiple items with diverse wording and implied concepts can lead respondents to the conclusion that they are supposed to differentiate and provide different answers to different items. A split-sample study would help to resolve this issue and provide valuable information about possible differences in response distributions.

In sum, there is a lack of studies considering conceptual issues, issues of consistency, and construct validity. We therefore cannot be sure whether all the studies in the field measure the same thing, as some evidence suggests, or different concepts with diverse predictors. Conceptual and methodological implications of the formulation of survey measures are rarely contemplated in the reviewed studies. Moreover, indicators are often constructed without mentioning their underlying concepts or assumptions, or without awareness of it. In a broader scope, Saris and Gallhofer (2014) report that researchers often think in terms of questions, disregarding the basic concepts-by-intuition, i.e., concepts meaning of which is readily obvious and are the basis of questions. Researchers then form more complicated constructs without a clear awareness of basic concepts they measure or attempt to measure by chosen questions.

This is a state of conceptual vagueness, further exemplified by the diversity of terms used to denominate what is to be measured. Such diversity, lack of definitions, and scarce reflection of the operationalisation process (McCright, Marquart-Pyatt, Shwom, Brechin, & Allen, 2016) lead to ambiguity and uncertainty of what is being measured, lower comparability of results, lack of specificity (Dreyer et al., 2015), and consequently to different results both in terms of descriptive statistics and explanations of differences or determinants of measured dependent variables as will be also evidenced later in this dissertation (a situation similar to the early measurement of environmental concern, see Dunlap & Jones, 2001).

3.2.2. Attitudes, behaviours, concerns, and others

The existing diversity in terms and concepts as overviewed in the previous section points to a lack of clarity in theoretical background of the measures and concepts used. Policy support, acceptability, acceptance, and related concepts are referred to as attitudes (Cools et al., 2011), preferences (Konisky, Milyo, & Richardson, 2008), a conative component of environmental attitudes (Schaffrin, 2015), or a behaviour itself (Stern, 2000; Tobler et al., 2012). Simultaneously, the terms *support*, *acceptability*, or *acceptance* have been widely used interchangeably. Willingness to pay higher taxes or prices, for example, has been used to measure environmental policy acceptability (e.g., Gelissen, 2007; Stern, Dietz, Abel, Guagnano, & Kalof, 1999), the degree of public support (Jin & Shriar, 2013), or environmental concern (Franzen & Vogl, 2013a).

Ha and Mulye (2015, p. 205) state that the “psychometric properties of the public support construct have not been thoroughly investigated” and that the construct has multiple factorial structure, that remained overlooked by researchers so far (most measures reviewed in previous subsection are based on an assumption of a unidimensional structure). The authors argue to support the structure of the construct by theoretical reasoning rather than empirical data. In the following text, different conceptual bases for measures of public attitudes and responses to policies are examined with respect to theories of attitudes and their measurement.

Some authors have already proposed definitions of one (or two) of the three most widely used terms, i.e. *acceptability*, *acceptance*, or *support*:

- Eriksson, Garvill, and Nordlund (2006, p. 16; also cited by Cools et al., 2011) state that acceptability “refers to the degree of positive or negative evaluation of a [...] measure that may be implemented in the future”.
- Schade and Schlag (Schade & Schlag, 2003, p. 47) regard acceptability as an affirmative attitude or “prospective judgement of measures to be introduced in the future”.
- Dreyer and Walker (2013, p. 344) define it in line with Schuitema, Steg, and Forward (2010) similarly as „a favorable or unfavorable evaluation of a policy before implementation“, while *acceptance* is such an evaluation after the policy has been implemented.

Both *acceptability* and *acceptance* are usually defined as attitudinal constructs, although Schade and Schlag (2003) regard *acceptance* as both attitudes and behaviour as responses to policy already implemented. Batel and her colleagues (2013) argue *acceptance* is based on attitudes, hence passive, while *support* comprises also a behavioural component. They also give some empirical evidence for the difference between *acceptance* and *support* in the field of public responses to energy infrastructures. According to their results, “support implies a more active and favourable position towards power lines, whereas acceptance seems to be more related with a passive reception of those infrastructures, with people tolerating but not actually supporting them” (p. 4). 16% of respondents in their study did accept the proposal and not supported it at the same time. Their general conclusion about distinguishing the two concepts is in line with the results provided by Dreyer and Walker (2013) and Dreyer, Teisl, and McCoy (2015) overviewed previously, although these studies compared support and acceptability.

Policy responses have also been treated as a distinct type of environmentally significant behaviour. According to Stern’s (2000) widely used classification of environmentally significant behaviours, *acceptance* (or *acceptability*) of and *support* for environmental policies are cases of non-activist behaviours in the public sphere, as opposed to environmental activism (e.g., active involvement in environmental organisation) and private-sphere environmentalism (e.g., consumer behaviour, use of appliances etc.). In Schaffrin’s overview, policy support is a behaviour to which intention precedes, i.e., intention to support a policy. In line with such conception, Eriksson, Garvill, and Nordlund (2006, p. 16) summarize that policy *acceptability* has been in the past examined as an indicator of “readiness to act pro-environmentally”. *Support*, *acceptability*, or *acceptance* regarded as such would consist primarily from actions stemming from or declaring some underlying positive or affirmative attitude (and negative or dismissing in case of opposition), such as voicing an opinion. Ha and Mulye (2015) for example define policy *support* as voting behaviour and voting intention of the public towards the stance government declares on climate change mitigation. Dreyer, Teisl, and McCoy (2015) base their definition of *support* on Stern’s and colleagues’ (1999, p. 82) definition of a supporter of environmental movements: “supporters are those who are sympathetic to the movement and who are willing to take some action and bear some of the costs in order to support the movement”.

Such definitions incorporate behaviours as well as attitudes. *Support* thus defined implicitly assumes attitudes leading to actions, which is analogous to embedding a whole

theory of attitude-behaviour relationship into a single definition (Eagly & Chaiken, 1993). Turning to classical definitions of attitudes, this was the case indeed:

- Allport (1935, p. 310) defines attitude as “a mental and neural state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual’s response to all objects and situations to which it is related”.
- Thurstone (Thurstone, 1931, p. 255) defines attitude as a “potential action toward the object with regard only to the question whether the potential action will be favourable or unfavourable toward the object.”

Jaccard and Blanton (2005) list several more definitions of attitudes, all linking attitudes to the concept of behaviour or action. As such, attitudes are regarded as dispositions to behave in certain ways or a source of behavioural motivation (Rajecki, 1990). In practice however, behaviour is commonly studied as both the outcome and the determinant of attitudes (Jaccard & Blanton, 2005).

Furthermore, attitudes have been often regarded as comprising from three distinctive components: affective, cognitive, and conative (Schwarz & Böhner, 2001). Public support, therefore, has been studied as a conative component (i.e., behavioural intention) of environmental attitudes or environmental concern (see also Dunlap & Jones, 2001) together with other components – cognitive (knowledge, beliefs), affective (emotive, evaluative), and behaviour as such (policy support as action and personal action) (Schaffrin, 2015).

The understanding of attitudes has, however, shifted away from this behavioural conception (Jaccard & Blanton, 2005). For one, cognition, affect, and behaviour are more often regarded as the bases of the psychological evaluative tendencies, rather than constituents of attitudes (Fabrigar, MacDonald, & Wegener, 2005): “affect, beliefs and behaviours are seen as interacting with attitudes rather than being their parts” (Albarracín, Johnson, Zanna, & Kunkale, 2005, p. 5).

These more recently adopted perspectives all derive from Eagly’s and Chaiken’s (1993, p. 1) widely cited definition of attitude as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor”. A very useful trait of this definition according to Bartels (2003) is the distinction between the psychological tendency and its particular expression (response) – attitudes are separated from individual attitudinal judgements (Eagly & Chaiken, 2007). This view corresponds with the more general distinction between *concepts-by-intuition* and *concepts-by-postulation* developed by Saris and Gallhofer (2014). Attitudes are constructs, i.e., concepts-by-postulation, which need to be defined - either by the three proposed components (affective, cognitive, and conative), by their expressions (responses), or in other ways supported by a sound theory. In all cases, these definitions are based on and operationalised by concepts-by-intuition, which are more or less immediately perceived and/or understood by respondents, and include concepts such as feelings, evaluations, judgements, norms, or observable behaviours (Saris & Gallhofer, 2014). This broader distinction of concepts serves well in the understanding of the methodological implications of distinguishing policy attitude as an underlying evaluative tendency from its specific expressions, i.e., policy responses.

The evaluative tendencies that constitute attitudes are unmeasurable per se and may very well be stable and consistent. On the other hand, the responses through which they manifest may change. Differences between answers to questions on support and acceptability (e.g., Batel et al., 2013) may therefore be a result of measuring different evaluative responses to an object, i.e., policy, rather than entirely different concepts. According to Eagly and Chaiken

(1993, 2007), different classes of evaluative responses may not be empirically separable. The classes are more like a conceptual framework to map and express possible responses, not necessarily some distinguishable dimensions. On some occasions, however, they may be separable and even inconsistent with each other depending on direct or indirect mode of presentation of the object, nonverbal or verbal nature of the response (Breckler, 1984), and the type of the evaluated object (Eagly & Chaiken, 1993). According to Kahneman, Ritov, and Schkade (1999), different responses may also have distinctive determinants.

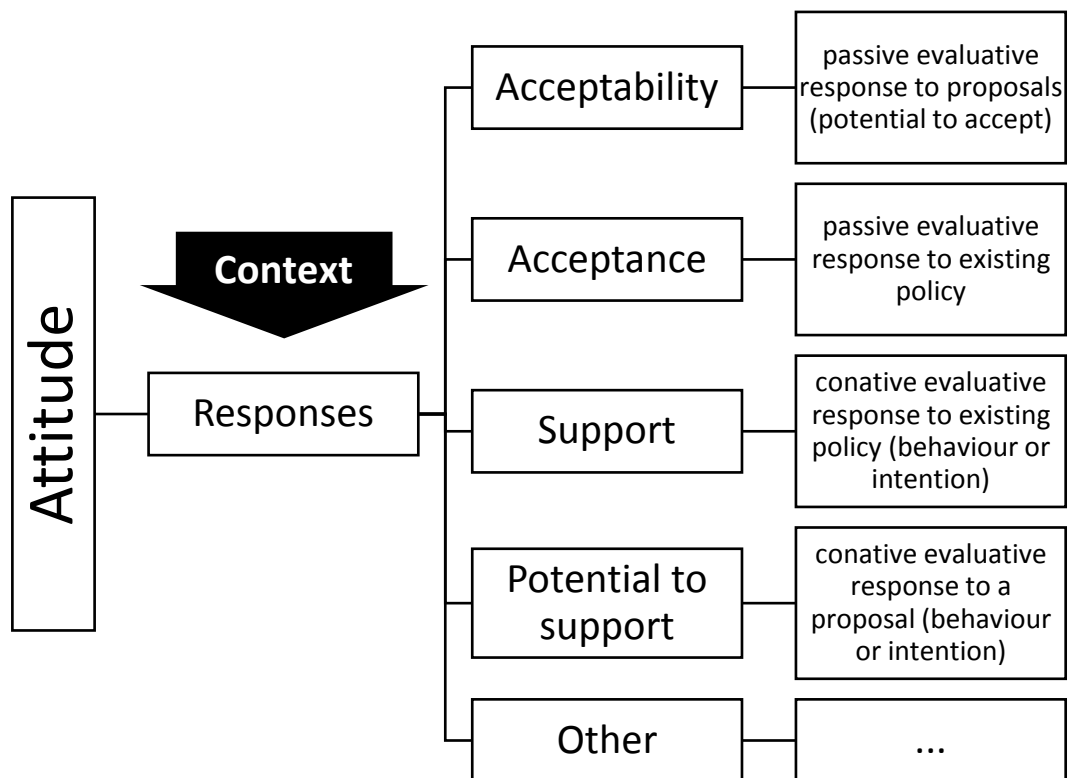
Eagly and Chaiken (1993) argue that the proposed components of attitudes – affective, cognitive, and conative – are rather classes of evaluative responses to an object. In this perspective, behaviour toward some object is regarded as a manifestation of the underlying attitude (Tourangeau & Galesic, 2008) or as a type of an evaluative response (Eagly & Chaiken, 1993).

An alternative explanation, parallel to Eagly's and Chaiken's (1993) account of attitudes, can be formulated based on the item response theory, sometimes also called latent trait theory. The theory assumes there is a singular latent concept which is observably manifested through responses to discrete survey items and must be inferred from these responses. As van der Linden (2016, p. xvii) states "[t]he responses are the joint effects of both the properties of the items and abilities of the test takers" – or respondents' attitudes.

In item response theory, the items are differentiated by their difficulty, i.e., the likelihood of correct answer or positive attitude. The difficulty of items or whole tests is modelled separately from the ability (or attitude) of the test taker (van der Linden, 2016). In classical test theory (all studies reviewed in this text stem from this tradition), the obtained scores are indicative of both an attitude of a respondent and difficulty of an item and hence confound the two. Researchers therefore cannot distinguish whether the observed differences are differences in the underlying attitude (and the measures being compared are tapping into different concepts) or whether these are differences in how a singular attitude is expressed in dependence on measurement and provided context. Application of item response theory on policy responses could provide valuable insights into variability of the responses based on item difficulty and discrimination (see also DeMars, 2010). The theory can also be useful for item formulation and wording, which can result in diverse levels of item difficulty depending on inclusion of costs, hypotheticality, and other factors as discussed throughout this section. Item response theory is therefore complementary to the operational definition based on Eagly's and Chaiken's proposition of attitudes, since it too assumes one underlying concept manifested variably in response to context and item formulation.

Departing from Eagly's and Chaiken's (1993) definition of attitudes then, the key stone of the concept of policy attitude presented in this dissertation is the distinction between the attitude itself and responses through which it manifests. Acceptability, acceptance, and support are defined here as distinct classes of evaluative responses to policies stemming from an underlying psychological tendency (see Figure 2 and Table 4).

Figure 2: Conceptual model of policy responses



As stated above, these classes of responses may or may not be distinguishable based on a diversity of factors. Here, two key distinctive criteria are identified based on previous attempts to differentiate between acceptability, acceptance, and support. The distinction between the individual classes is based on a) the presence or absence of conative aspect of the response and b) the hypotheticality of the evaluated object.

First, distinction is made in whether the policy has already been implemented or not. In other words, whether the policy proposal provided to the respondent is an actual proposal discussed in the public, or whether it is merely a hypothetical scenario constructed by the researchers for the purposes of the questionnaire. Such scenario would require imagination and making predictions about possible context and one's own responses. The distinction is particularly important when interpreting results of polls and surveys. The communicative and social context and social organisation around the issue are readily available to respondents if the proposal is debated within the processes of public opinion. On the other hand, such context is lacking for hypothetical scenarios. The context comprises not only media outtake of the issue, governmental policy communication, or previous polls, but more importantly respondents' experiences and communications about the issue with others. If the policy issue and surrounding debate were salient, respondents' answers would more often be temporary and momentary results of social and communication processes of public opinion. If the scenario was purely hypothetical with no previous public background or debate, answers would be more often based on purely intra-personal considerations or attitudes and derived from ongoing public opinion processes around related issues or approximated by opinions on different issues which respondents have already discussed with others.

Second, the degree of conation involved in certain response is likely to be related to the degree to which respondents are willing to endorse positive or negative evaluation. In this respect, individual behaviours are in a way costlier than attitudes. To express willingness to support some policy or to pay for it is a greater engagement than to passively express a

positive meaning about it. This distinction is somewhat parallel to the concept of difficulty in item response theory (the difficulty of the item, however, concerns the item per se, not what it implies for the respondent's behaviour). The basic assumption here is that the more difficult it is or would be to perform or express the given response, the less likely respondents would respond in such a way.

Although there is some evidence, as overviewed earlier, that there are differences in answers to questions measuring two different classes of responses (e.g., support and acceptability), some issues addressed below remain problematic. Further distinction of the classes of responses is therefore based on several considerations:

- *To be acceptable* is explained as to be “capable or worthy of being accepted” or to be “capable of being endured; tolerable; bearable” or “satisfactory, agreeable” (dictionary.com). Hence acceptability can be regarded as a potential of acceptance, i.e., potential of a favourable or at least not unfavourable reception of a proposed policy. It follows that acceptance is such a reception of an actual policy.
- *Acceptance* is distinct to other more behavioural responses, such as support, or compliance with a policy, since it is relatively passive and does not require any behavioural manifestation.
- *Support* as a type of behavioural response encompasses actual behaviour as well as intentions to act. Other self-predicted behaviours (e.g., voting in a referendum in favour of policy) can also be regarded as responses of this class.

Table 4: Examples of measures of evaluative responses to policies and policy proposals

Response class		Measures (examples from review)	Source
Acceptability	passive evaluative response to proposals (potential to accept)	How acceptable do you find the fuel economy standards?	(Dreyer et al., 2015)
		Do you favour or oppose this proposal?	(Pietsch & McAllister, 2010)
		Next, I am going to read some specific proposals. For each one please say whether you generally favor or oppose it:	(McCright et al., 2013)
		For each of the following, please tell me whether you favor or oppose the federal government doing it.	(Krosnick & MacInnis, 2013)
		To what extent do you agree with the policy of putting a price on carbon?	(Unsworth & Fielding, 2014)
		On balance, would you approve or disapprove of government policies that encourage the production of biofuels from the following types of plant matter?	(Dragojlovic & Einsiedel, 2015)
Acceptance	passive evaluative response to existing policy	<i>may generally be the same as acceptability (except questions requiring to make predictions)</i>	

Table 4 *continuing*

Support / potential to support	active evaluative response to proposal or existing policy (intention or self- reported behaviour)	How much do you support or oppose the following policy proposals?	(Yang et al., 2014, 2015)
		How supportive are you of the fuel economy standards?	(Dreyer et al., 2015)
		A number of policy alternatives have been proposed to deal with the problem of global warming and the resulting climate change. For each one listed below, please indicate whether you strongly support, support, oppose, or strongly oppose that policy.	(Stoutenborough et al., 2015)
		If you could vote on each of these agreements in a referendum, how likely is it that you would vote in favor or against each of the agreements? Please give your answer on the following scale from definitely against (1) to definitely in favor (10).	(O'Connor et al., 2002)
		Please see below a list of climate policies that are currently in place in British Columbia. If there were a referendum on maintaining these policies in BC, how much would you support or oppose these policies?	(Rhodes et al., 2014)
		How willing are you to take action to voice a positive opinion about the fuel economy standards, such as writing a letter or calling a representative?	(Dreyer et al., 2015)
		Are you willing to make adjustments to or sacrifices for this policy?	(Lam, 2015)
		I would be willing to pay higher taxes to reduce global warming. (agreement with statement)	(Joireman & Liu, 2014)

It is important to distinguish between hypothetical and real-world policy proposals within classes of behavioural responses. Intentions and actual behaviour can be manifested and thus measured only if the policy has been publicly proposed or implemented. Otherwise it is not a real object toward which respondents may act or intent to act. If a policy proposal is purely hypothetical, in other words formulated by the researcher alone, respondents have to imagine what their reactions would be if such a policy would be actually proposed. In such instances, hypothetical referendums are used, as well as questions “Would you support...?” or indicating likelihood of support reflecting respondent’s expectations and predictions about her or his own behaviour, or measures of degree of present support (e.g., “How supportive are you...”) to hypothetical proposals. Although such questions indicate intention to behave in a certain way, it is important to be always aware of the fact that the proposals or scenarios are hypothetical and omitting, self-evidently, factors that may influence the respondents’ attitudes and decisions once the policy is publicly discussed and proposed in a specific context and formulation.

There are no actions of support or opposition the respondent may carry out or intent to in the present (she or he can only speculate). In consequence, these questions measure potential or readiness to support, rather than support, similar to acceptability measuring potential or readiness to accept, and are thus close to the concept of acceptability. There is however a possibility that the wording (*to support* vs. *to accept*) makes a difference, since *support* implies more involvement on the part of the respondent. As reviewed above, Dreyer and Walker (2013) compared two questions on acceptability and support and obtained different results. On the other hand, the policy they used in their questionnaire was a real and specific proposal

by the government, not a hypothetical scenario, and the two measures had also different response formats which could have contributed to the observed discrepancy in results. Nevertheless, the limitation of hypothetical scenarios should be always considered in the interpretation of results.

Including costs into policy proposals presented to respondents also constitutes an important consideration. Willingness to bear costs (or willingness to pay) is mostly regarded as behavioural intention (for example Hansla, Gamble, Juliusson, & Gärling, 2008) and as such, Dreyer, Teisl, and McCoy (2015) included it into their composite measure of policy support. Similarly, if the question inquires how acceptable a policy imposing specific costs is, the responses imply readiness to behave – a positive attitude would imply willingness to bear these costs. Based on evidence of significance of cost visibility for public responses to policies (Chaudoin, Smith, & Urpelainen, 2014; Rhodes & Jaccard, 2013), it is highly recommended to include costs, where sensible, to elicit more pessimistic and probably also more realistic estimates of positive evaluations of the policy. It however somewhat blurs the distinction between acceptability and support, since it measures potential to accept, a passive evaluative response, and at the same time can be regarded as an intention to act. Given the inherent passivity in merely accepting to bear costs which does not require any thoughtful or planned action, it can be argued to include measures of acceptability of policies implying costs under the concept of acceptability, rather than support.

Differences between measures may also be illustrated by the results of Study 1 (included later in this chapter): a measure of general acceptability of environmental policy computed from three Likert-type items was compared with willingness to make economic sacrifices for environmental protection (to pay higher prices, taxes, and to lower living standard) in the Czech ISSP 2010 dataset. The two composite measures were not correlated at all (nor were individual items between the two triads of items). This is an expected result for different classes of responses (one being more behavioural and reflecting that costs have been imposed), although one would assume that these responses would be at least slightly correlated if they originated in the same attitude. Other issues may have entered the decision-making process of the respondents or the measures simply reflect different concepts. Moreover, in terms of the item response theory, the two measures could differ in their difficulty, which would also result in the observed discrepancy, but also originates in the formulation of the used items (see below). Either way, both indexes are representative of measures of general attitudes used in the research of environmental concern and policy attitudes, leading to uncomfortable questions about comparability of the existing results.

More research is needed to compare the different measures and formulations. The assumption that different classes of responses to policies and policy proposals exist can be tested through comparison of correlations between different measures and their respective classes. If correlations of measures within one class are higher than with measures from other class or classes, than the assumption would be true (Eagly & Chaiken, 1993). Otherwise the responses are not empirically separable and we can study public responses to policies as a unidimensional concept. So far, only two studies compared two possible classes with mixed results partially supporting the distinction between support and acceptability (Dreyer et al., 2015; Kyselá, 2015).

Differentiating between possible responses is not important only for its methodological implications or possible differences in obtained results, but also with respect to the way researchers define problems they study. Terms used to define research questions and

constructs are part of the reality that is to be studied and may have a significant influence on how respondents, fellow researchers, or policy makers perceive and handle studied issues. Batel and colleagues (2013) for example argue that *acceptability* and *acceptance* are terms strengthening the prevalent top-down policy discourse focused on proposing policies at governmental level and imposing them on public, which is ought to accept them.

Existing terms also limit the scope of research. The terms *acceptability*, *acceptance*, and *support* are by far the most prevalent, although they list only few of possible reactions of the public. Citizens may oppose (both passively and actively), ignore, and defy the policy, protest it in diverse ways, as well as manifest active support, sympathise with it, or be uncertain about it (see also Hmielowski & Nisbet, 2016, bringing attention to the diversity of actions in active public support or opposition to policies).

Moreover, the present research entirely omits affectual reactions. People may feel pleased or displeased by the policy, content or discontent, may like it or not, believe it or find it insensible etc. Different kinds of evaluations are possible responses to policies and policy proposals. By using the terms comprising only a limited set of evaluations, researches help to create a constricted reality where citizens may either support, or oppose the policy, accept it, or not, and nothing more. As a solution, Batel and colleagues (2013) propose to use a broader and encompassing term *public response* as also argued in this dissertation.

Nevertheless, the term *policy acceptability* (and accordingly also *acceptance*) can be deemed suitable in discussing national or top-down policies if clearly defined and understood with its implications. If the government proposing a policy is interested in what people think about the policy, the term *acceptability* has its utility. This utility, however, is restricted to only a part of what people may think about a policy. If carefully constructed, a measure of policy acceptability can inform policy makers about public readiness to passively accept a policy and even bear some costs related to it. It cannot, however, predict (or even attempt to predict) what other responses (Figure 2) a proposal may invoke – when measuring acceptability, researchers are interested in one response only. The measure therefore implies a specific research problem.

Similarly, *policy support* has its distinctive use as defined above. Yet in research practice, the term has been used broadly as any evaluative response to policies, but in general it corresponds to the distinction made here (in the least by its wording). The term is widely used in literature on environmental concern in relation to aggregate public response to policies and public attitude to governmental action. As it encompasses also public demand for such action, the term, evoking proactive stance, is suitable in some cases, but is not representative of the overall attitude as a psychological tendency expressed by diverse evaluations – especially in cases when single items are used to measure popular support, the focus is only on one kind of evaluation.

Rhodes, Axsen, and Jaccard (2015, p. 104) state that “[t]here is little consensus in policy literature on what type or level of public support is required for a given climate policy to be deemed [politically] acceptable”. As discussed in section 2 on policy responsiveness to public opinion, there is no consensus in policy literature, since there is no clear-cut point of overall popular acceptability or support, i.e., a share of citizens to accept or support a policy that is high enough to safely conclude that policy is acceptable or supported enough to be implemented. Moreover, given the context-dependency of policy responses, there is not any universal type of public response that would be safe enough to proclaim as required for deeming policy universally supported by the public. Rather, researchers should explore

readiness to response in different ways, e.g., by attitude construction, affect, or behaviours, to policy proposals in order to inform the process of policy formulation and implementation.

The quest to measure how acceptable or supported policies are and if it is enough, is directly mirrored in concepts and measures used. These measures limit the current research to only a small set of possible responses, therefore reflecting reality only partially, providing incomplete and maybe even misleading results. Other possible responses should therefore be examined and included in research designs, but with careful embedding in the core concepts of attitudes and consideration of possible links to other responses. These methodological issues further represent a large and challenging task for future research.

3.2.3. General and policy-specific attitudes

Is there some general underlying attitude toward climate policy as a political endeavour? And if it is, how do responses to specific policy proposals relate to this general attitude? So far, the basic nature of the concept behind acceptability, acceptance, support, and other policy responses has been settled in this text as an attitude defined in line with Eagly and Chaiken (1993, p. 1) as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor”. So far, the implications of adopting this definition for defining different policy responses have been discussed with only limited attention to the “particular entity”. In what follows, two different approaches to specifying this entity, i.e., climate change mitigation policy, are discussed.

Measures reviewed in this dissertation focus on climate policies in two different ways – some attempt to measure a general attitude toward climate policy as a principle or toward governmental action on climate change in general (“something is to be done about climate change”, “government should do something about it”, etc.), others measure attitudes toward specific policies or policy proposals. In both cases, the attitude object or entity is climate policy, but with different levels of generality. Although the generality of policy description is clearly a matter of degree on a scale from general political action to specific policy instruments, the two research strategies can be clearly identified and distinguished.

The distinction is particularly relevant considering the differences in research and policy-making goals. First, researchers have long been interested in studying to what degree is the public interested in environmental issues, concerned about them, and willing to contribute either financially or by passive acceptance of environmental protection. As discussed in section 2, polls and surveys of public opinion on these broad matters are regarded as an input to policy-making process in its first stage of setting priorities and problems to be solved. Accordingly, researchers are keen to understand how these attitudes and opinions form and change, and how the issues become prioritized or neglected as general problems to be solved. Second, attitudes and opinions about more specific matters are often sought out in the evaluation stage of the policy-making process, reflecting how public considers different policy proposals and gauging their responses to such proposals once they would be implemented.

All these objects of interest belong to the same class of environmental policy, but by the nature of the two broadly defined aims are very different regarding to what degree they are specific or general. Since policy characteristics are immensely important in respondents' evaluations of climate policies (see chapter 4), the entities, although the same class, are far from being equal. First, the different approaches to policy attitudes based on the delimitation of the attitude object are discussed in this section. In chapter 4, empirical studies focusing on factors related to climate policy attitudes are reviewed in accordance with this delimitation.

As mentioned previously, policy *support* has been sometimes defined or interpreted as a component of environmental concern (Dunlap & Jones, 2001; Schaffrin, 2015) and measures of support for environmental policy or action in general have been included in overall indicators of environmental concern. Environmental concern has hence been defined as composed by “the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solution” (Dunlap & Jones, 2001, p. 485). This approach assumes the existence of an underlying attitude toward environmental policy action in general which in turn leads to similar responses to more specific proposals used in survey measures as reflective indicators of the underlying attitude. Aggregation of single items has been argued to lower measurement error and produce stable results indicative of general public attitudes (Ansolabehere, Rodden, & Snyder, 2008). Usually, multiple items are combined in indexes in line with the psychometric theory and survey measures are worded broadly (e.g. indicating whether one is in favour or opposes ‘Stronger environmental protection laws for business and industry’, ‘Make laws requiring that all citizens conserve resources and reduce pollution’ and other broad environmental policy strategies – example from Xiao & Dunlap, 2007; or the ISSP 2010 items ‘How willing would you be to pay much higher prices in order to protect the environment?’ and ‘And how willing would you be to pay much higher taxes in order to protect the environment?’). A strategy based on this assumption is used for domain-specific policies such as climate policy as well.

In this respect, three approaches to composite measures of the underlying attitude toward climate policy in general can be differentiated (see Table 5). The first strategy involves measures of multiple responses to one specific or general object and has already been discussed in this text (Dreyer et al., 2015; Lam, 2015). Dreyer’s and colleagues’ (2015) measures have high internal consistency (Cronbach’s α 0.91 for acceptability and 0.84 for support), similar to Lam’s and colleague’s measures created as average of two items – “Are you willing to make adjustments to or sacrifices for this policy?” and “Would you support this policy?”. The ten pairs (for ten policies) have all adequate values of Cronbach’s α ranging from 0.82 to 0.94.

Kachi, Bernauer, and Gämpfer (Kachi et al., 2015) opted for the second strategy and constructed an index from five items encompassing several policies and different responses accompanied by diverse response formats (see Table 43 in Appendix). The resulting measure indicates a multifaceted response to a variety of policies, i.e., the underlying evaluative tendency of climate policies in general. The measure had high internal consistency (Cronbach’s α 0.84 and 0.96 for Germany and the US respectively).

	Response	Policy	Example	
composite (index)	multiple	single	acceptability: How acceptable do you find the fuel economy standards? To what extent are you in favor for or against the fuel economy standards? To what extent do you agree or disagree with the fuel economy standards? Do you prefer having the fuel economy standards in place, as opposed to no fuel economy standards? support: How supportive are you of the fuel economy standards? How willing are you to bear some of the costs resulting from the fuel economy standards? How willing are you to take action to voice a positive opinion about the fuel economy standards, such as writing a letter or calling a representative? Are you willing to make adjustments to or sacrifices for this policy? Would you support this policy?	(Dreyer et al., 2015)
			<i>Subsidies for using renewable energy</i>	(Lam, 2015)
			...	
	multiple	multiple	<ul style="list-style-type: none"> • People hold different views about whether policy-makers should give priority to measures against global warming, even if such measures have a negative effect on the economy. What is your view? • To deal with global warming, do you think the government of the United States is doing ... • Do you favor or oppose preserving or expanding forested areas, even if this means less land for agriculture or construction? • Do you favor or oppose increasing the requirements for fuel efficiency of automobiles, even if this raises the cost of cars and bus fares? • Imagine that taking effective steps against global warming would increase energy costs to the average household in the United States by 20 dollars per month. Would you be willing or not be willing to pay this additional cost as part of taking steps against global warming? 	(Kachi et al., 2015)
	single	multiple	A number of policy options have been proposed to deal with the problem of Global Warming and Climate Change. I am going to read a number of policy options to you. For each policy option, please indicate whether you: strongly support (4), support (3), oppose (2), or strongly oppose that policy (1).	(Lubell et al., 2007)
			<i>Educate the public on the human causes of global warming and climate change</i> <i>Legally require more energy efficient appliances, and industrial systems</i> ...	
single item	single	single	To what extent do you agree with the policy of putting a price on carbon?	(Unsworth & Fielding, 2014)

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Kallbekken, García, and Korneliussen (2013) report similar evaluations of fuel tax, road prices, and parking fees and Jagers, Löfgran, and Strippel (2010) found a positive relationship between attitudes to an increase in carbon tax and an alternative in personal carbon allowances scheme.

These results point to an underlying general attitude that manifests in responses to specific policy measures rather than multitude of attitudes toward specific policies. This idea is also in line with previous results from research in environmental attitudes more generally – Milfont and Duckitt (2010) explored the internal structure of environmental attitudes and arrived at the conclusion that there is a single underlying second-order factor of generalised environmental attitudes on which other first-order factors are loading (they identified 12 of such factors).

Table 6: Internal consistency of composite measures of policy attitudes

Study	Nr. of items (for wordings see Table 43 in Appendix)	Cronbach's α	Factors
(Bernauer & McGrath, 2016)	<i>attitude</i>	3	0.77
	<i>beh. intention</i>	4	0.67
	<i>env. citizenship</i>	7	0.95
(Bord et al., 2000)		7	0.80
(Bostrom et al., 2012)		11	3
(T. Dietz et al., 2007)		8	0.89
(Ding et al., 2011)		6	0.88
(Evans, Milfont, & Lawrence, 2014)		2	0.62
(Hart, 2011)		2	0.74 ^a
(Hart & Nisbet, 2011)		3	0.71
(Joireman & Liu, 2014)		2	0.94 ^a
(Kachi et al., 2015)	<i>Germany</i>	5	0.84
	<i>USA</i>		0.96
(Leiserowitz, 2006)		6	0.84
		3	0.78
(Lu & Schuldt, 2016)		3	0.72
		3	0.80
(Lubell et al., 2007)		11	0.86
(McCright et al., 2013)		3	1
(McCright, Dunlap, et al., 2016)		6	0.91
(O'Connor et al., 2002)		4	0.78
(Rhodes, Axsen, & Jaccard, 2017)	<i>supply-focused regulations</i>	3	0.75
	<i>voluntary policies</i>	3	0.67
(Rickard et al., 2016)		12	0.85
(Rosentrater et al., 2013)		5	0.68
		3	0.55
(Severson & Coleman, 2015)		4	0.67
(Smith & Leiserowitz, 2014)		9	0.90
(Schmöcker et al., 2012)	<i>UK</i>	2	0.86
	<i>Japan</i>		0.91
(Steg et al., 2011, 2005)		16	0.90
(Tobler et al., 2012)		9	2
		(5)	0.83
		(4)	0.85
(Yang et al., 2014, 2015)		5	0.84
(Zahran, Brody, Grover, & Vedlitz, 2006)		11	0.86

^a Correlations

Nevertheless, it is likely the battery format of questions increases consistency in evaluation of single policies. For one, batteries are usually cognitively more demanding than single items and some respondents resort to satisficing (Barge & Gehlbach, 2012). If *don't know* option was not provided, acquiescence bias may be present, i.e., respondents gave similar answers to similar questions with similar response format (Krosnick, Judd, & Wittenbrink, 2005) meaning that those who are forced to indicate attitude even if they are indifferent or would prefer not to respond may contribute to associations between the variables (Schuman, 2008). Differentiating between policy instruments described in general terms or labels and presented all at once may also be too demanding – it is easier for the respondent to evaluate all policy options similarly since they all have a similar or common goal (yet there are cases of policies sticking out, such as any taxes usually; these cases bear evidence of the ability of respondents to differentiate in batteries).

Apart from assuming there is an underlying attitude toward climate policy in general, measuring this underlying attitude by responses to several specific policy strategies or instruments further assumes that this general attitude translates to attitudes toward specific measures directly.

First, in many policy domains, this assumption would not hold, given the existence of so called principle-implementation gap (Krosnick & MacInnis, 2013). Citizens may support a general policy principle (e.g., racial integration in schools or emission reductions), but oppose literally any specific policy delivering the principle result. According to Krosnick and MacInnis (2013) there is no such gap in emission reduction policy – U.S. respondents in their surveys indicate similarly positive attitudes toward general and specific policies. Bechtel and Scheve (2013) included general support for international climate agreements as an explanatory factor for choices of international agreements specified in a conjoint design by several specific attributes. The authors concluded that those who are generally not inclined to support international cooperation on GHG emissions reduction are more cost averse than those who have positive attitudes in general. The latter group is more sensitive to other attributes of international agreements, such as the number of participating countries and the amount of emission reductions. Hence, although there may not be an obvious value-implementation gap in case of emission reductions, the relationship between general and policy-specific evaluations is not straightforward and may lead to some interesting surprises in future research.

Second, responses to specific proposals and factors related to these responses can vary substantially based on policy characteristics or framing (see chapter 4). Questioning the use of indexes of policy responses, Stoutenborough and colleagues (2014, p. 575) compared factors explaining variance in individual items and their composite index and found important differences: “there are variations in the predictive influences of all but two of the variables – concern and ecological values. Apart from these two, the results suggest that the basic assumption of aggregated studies does not hold”. Similarly, Rhodes, Axsen and Jaccard (2017) found only three variables consistently associated with positive evaluation of different policies (climate change concerns, trust in scientists, and female gender). Only trust in fossil fuel industry was common factor for negative evaluation.

Third, since attitude objects, in other words the entities being evaluated, are not actual objects, but mental representations of them (Kahneman et al., 1999), characteristics of an object are processed through subjective mental categories and some may not be processed at all unless made salient by researchers. In consequence, the resulting value of the composite

measure will depend on what policies were included in the battery and how were they specified. This is even more problematic in cross-national comparative studies, since national contexts, such as what policies have been already implemented, previous policy failures etc., can lower comparability of answers to single items and hence also to a composite index. Bostrom and colleagues (2012) have identified three separate factors in a battery of 11 policy-specific items: carbon policies, green policies, and engineering. Tobler, Visschers, and Siegrist (2012) identified two factors among 15 items: supportive measures and CO₂ restrictions, both with high internal consistency. Rosentrater et al. (2013) tested a composite measure of three behaviour approaches: changing lifestyles to reduce consumption, limiting population growth, and increasing taxes on all fossil fuels with the resulting Cronbach's α being 0.55 (see Table 43 in Appendix for detailed descriptions).

Moreover, methods sensitive to policy characteristics, such as experimental choice designs presenting respondents with several policy options defined by specified attributes, clearly show that people differentiate between these attributes (see chapter 4 for overview). Several studies have also consistently concluded that perceived effectiveness and fairness of policies as policy-specific characteristics are key explanatory factors of policy attitudes and responses (see also in chapter 4).

The contextual dependency of policy specific attitudes naturally raises a critical question how to determine what contexts and frames are appropriate for use in surveys and why (Bartels, 2003) and how to specify the policies presented to respondents. There is literally no way of presenting a specific climate policy that would not carry a label or frame potentially influencing provided answers. A common example is the difference between "carbon pricing" and "carbon tax". The latter usually leads to lower levels of acceptability, although the basic principle of the policy is the same (Brännlund & Persson, 2012; Carattini & Baranzini, 2014; Hardisty, Johnson, & Weber, 2009; Heres, Kallbekken, & Galarraga, 2015 for comparison of subsidies and taxes; although Villar & Krosnick, 2011 found no statistically significant difference).

So far, the recognition of contextual dependency has led to a fruitful advancement in research and to emergence of new ideas (Bartels, 2003). On the other hand, because of the current focus on statistically significant results and differences, results indicating consistency and negligible effects of frames are rarely published. In case of framing, however, these results are of the same relevance, contributing to our understanding of what frames influence general or policy-specific attitudes and what do not.

It is important to be aware of possible effects of context and frames while collecting and interpreting data, especially with respect to generalisability and comparability of the results. Researchers should be aware that their own selection of policy strategies or instruments provided to the respondents contributes to the result in a non-negligible manner. As Schuman (Schuman, 2008, p. 15) puts it in the case of abortion policy: "Except at the extremes, exactly which of these particular issues [on abortion] is posed and with what alternatives makes a considerable difference in the marginal results and thus a single set of marginal is likely to be misleading if taken to summarize views on abortion as a general issue".

Apart from composite measures, single items measuring response to climate policy as a general principle are used with the same aim to tap in general attitude (the fourth approach included in Table 5). There is at least one important problem with such general measures. Public spending, climate policy, governmental action on climate change, and other general objects are mentally represented in minds of respondents with the use of different

associations and representations bringing forward some policy considerations instead of others. Usually, policies that are more salient to them personally (Tversky & Kahneman, 1981) or currently covered by the media are easier to access in respondents' minds and hence get represented. Given the lack of policy-specific information, it is likely that respondents base their evaluations on cues (e.g., political party proposing the policy) or other attitudes, such as attitude toward governmental regulations in general, taxes in general, and environmental protection in general (Bernauer & Gampfer, 2015; Rugeley & Gerlach, 2012); see also Section 4.3. The diversity in these representations is then included in the measurement error and can obscure the results with no way for the researcher to examine it. With composite measures of attitudes to several specific policies, at least researchers have greater control over what policies are primed and how.

3.2.4. Policy preferences

The concept of preferences has its origin in economic theory, but the term has been sometimes used quite vaguely referring to citizens' opinions on policies, priorities, and statements about what government should do (as is noticeable from the discussion in section 2 on policy responsiveness to public opinion). It has often been used interchangeably with other terms referring to attitudes and with no regard to the underlying concept originating in economic theory.

The core assumption of the concept is based in rational choice theory. Hausman (2011, p. 8) argues that "preferences in economics are rankings that express total subjective comparative evaluations". Preferences, in contrast to attitudes, are assumed to be rationally consistent – if one prefers option A over option B and B over C, then A is preferred over C (axiom of transitivity). This assumption also implicates that preferences are invariant, i.e., should not be reversed dependent on arbitrary features of formulation or procedure (Bartels, 2003; axiom of context independence according to Hausman, 2011). Based on these assumptions, researchers treated preferences as something to be uncovered and registered by surveys or interviews (Payne, Bettman, Schkade, Schwarz, & Gregory, 1999).

Many economists have struggled with "anomalies", inconsistencies, and biases in respondents' answers, such as preference reversals, insensitivity to scope, framing effects, and context dependency, since these are contradicting the core assumptions and therefore the concept of preferences itself (see for example Svedsäter, 2003 for empirical results). Some researchers therefore argue that the assumptions are tenable only if people are familiar with the object and have experience with it (Payne et al., 1999). Nevertheless, it still posits that the object has to be defined carefully in order to uncover the preferences not biased by framing effects etc. (Payne et al., 1999).

Kahneman, Ritov, and Schkade (1999, p. 221) state firmly that "there is no stable preference order to be measured" at all. The authors argue that dollar responses (stated willingness to pay) are best regarded as attitudes, rather than preferences. The so-called anomalies, incoherencies, and other problems are merely "manifestations of known characteristics of attitudes and attitude expressions" (p. 204). On the other hand, Phillips and colleagues (2002), although concluding that measures of attitudes and preferences were generally consistent, found differences in respondents' deliberation of the two types of measures. This result led them to advocate advantages (and alert to disadvantages) of both approaches.

Most economists find the concept of preferences still greatly prolific, albeit needing revisions (Hausman, 2011). The theory needs to be reconciled with the abundance of empirical results pointing to the incoherencies and context-dependency of respondents' preferences. Hausman (2011, p. 133) argued to take "preferences to be total but context-dependent evaluations" through which other factors influence choices, rather than regard them as stable partial evaluations competing with other factors determining choices.

In the approach advanced by Hausman, preferences are regarded as constructed at the time of inquiry and their construction is contingent on characteristics of both the individual and the decision task. Moreover, they reflect core values for given attributes as well as particular strategies of selectively combining information (Hausman, 2011; Payne et al., 1999). With respect to these considerations, researchers need to focus on developing a theory of preference formation (Hausman, 2011) and, similar to social psychologists battling the context dependency of attitudes, carefully design measures and methods of preference elicitation.

Kahneman's, Ritov's, and Schkade's (1999) argumentation summarized above concerns dollar measures, by which the authors mean open-ended and referendum questions – stated preference matching methods usually referred to as contingent valuation (Carson & Louviere, 2011), although the term is often used more broadly (incorrectly). There are, however, also other methods of preference elicitation, such as discrete choice experiments (see for example Cai, Cameron, & Gerdes, 2010; Cole & Brännlund, 2009; S. Dietz & Atkinson, 2010). Kahneman, Ritov, and Schkade (1999) mention that presenting respondents with choices might be a better approach than asking them to consider issues in isolation (see also Hudson & vanHeerde-Hudson, 2012). Choice experiments offer a possibility to learn respondents' views with regard to specific policy attributes (such as effectiveness, instrument characteristics, cost distribution, revenue use, or policy label), context and cost, and allow for computing willingness to pay for these attributes, thus enabling a comparison between different contexts and attributes (see Alló & Loureiro, 2014; Nemet & Johnson, 2010; for review Zvěřinová et al., 2014). This is indisputably an asset of the economic approach, irrespective of how we regard the concept of preferences.

Furthermore, acknowledging both utility of the approach and its connection to attitudes can lead to a fruitful collaboration between economy and social psychology or sociology. Only few studies have chosen such combined strategy so far, but with interesting results (see for example Hansla et al., 2008). Guagnano, Dietz, and Stern (1994) used a social psychological Norm Activation Model of altruistic behaviour (NAM; Schwartz, 1977) to support Kahneman's and colleagues' (1993) suggestion to adopt a different model behind willingness to pay. In the more common purchase model, "stated WTP is presumed to be the amount an individual would pay given the consumer's typical choice between paying to have all of a good provided and not paying and thus having none of it provided. In contrast, WTP in the contribution model is presumed to be what the individual would contribute to a collective effort in which the amount of the good provided is directly related to the total of all contributions" (Guagnano et al., 1994, p. 411). In their study, the values of WTP were responsive in line with the NAM formulation which was originally proposed to explain attitudinally based behaviours.

3.3. Study 1: Comparison of support and willingness to make economic sacrifices⁹

The goals of this study are to identify factors influencing policy acceptability and willingness to make economic sacrifices and to compare the structure of factors influencing the two measures of policy responses. The study compares policy acceptability and willingness to sacrifice indicators in order to see whether they are indeed measuring the same thing or are influenced by the same factors. This could inform the practice of measuring and analysing policy acceptability, particularly when using datasets such as ISSP (International Social Survey Programme) or European Values Survey, where willingness to pay higher taxes and prices and to accept lower living standard for environmental protection are common variables used in cross-national and time-series analyses.

3.3.1. The context of the Czech environmental policy

The policy options presented in the 2010 questionnaire and analysed in this study (feed-in tariffs for renewable energy, ecological taxation of polluting businesses, and subsidies for residential heat insulation) have already been implemented in some form in the Czech Republic. Feed-in-tariffs for electricity from renewable energy sources were first implemented in 2000 and subsidies for home insulation are integrated within the *Green Savings* programme. There is no direct taxation of high-polluting businesses, although electricity and fuel taxes and air-pollution fees for non-carbon dioxide greenhouse gases are in effect (for a general overview of instruments see Máca, 2013).

The *Green Savings* programme incorporates not only subsidies for thermal insulation of residential (and later public) buildings, but also financial support for other measures – passive energy standards for new construction and switch to RES for heating. It was started in 2009, a year before the data collection. The awareness of this programme could have been still low at the time, although it has received a large portion of attention by media and political elites. The feed-in-tariffs for RES electricity received attention from 2009 until 2012 when a substantial change in legislation finally followed the controversy which arose due to too slow between-year decreases in guaranteed prices and falling prices of the technology for solar power plants. This highly profitable situation has led to an increase in the share of renewables from 4.9% in 2006 to 8.3% in 2010 (10.3% in 2011) and to a considerable increase in electricity prices (the RES premium increased from 34 CZK/MWh in 2006 to 582 CZK/MWh in 2010; data from the Czech Energy Regulatory Office). Moreover, many cases of corruption and unfair trading were uncovered (distrust toward politicians and governmental bodies could be expected on this account). The Czech Republic was also quite successful in biofuels production until 2009 when the steady support weakened in reaction to the biofuels controversy. Scepticism toward any environmental policy could be expected due to these rather controversial cases, negatively influencing support for some or all measures. The overall popularity of subsidies, and general preference for regulation of businesses¹⁰ could probably increase the acceptability of this type of instruments (*Green Savings* programme), while negative experience with support for RES could lead to overall negative attitude.

⁹ This text is a revised version of a published article: Kyselá, E. (2015). Acceptability of environmental policies in the Czech Republic: a comparison with willingness to make economic sacrifices. *Social Studies*, 12(3), 179–198.

¹⁰ Czech respondents in the ISSP 2010 Environment survey preferred state regulations more often if the subject of the regulation were businesses (83% of all respondent, $n=1427$) compared to markedly lower preference for regulations concerning citizens (60% of all respondent, $n=1427$).

3.3.2. Methods

ISSP data set

Data from the International Social Survey Programme 2010 Environment module for the Czech Republic are analysed. The collection of data took place during June 2010 by face-to-face pen-and-paper interviews. A representative sample of 1422 citizens aged 18 years or older is based on a three-level stratified probability sampling procedure.¹¹ The response rate was 64.9% (including the boost data for young population, excluded from analyses in this study). The data were weighted for correction of the sampling design and unit non-response.

The variables entering the analyses were checked for missing data. No pattern was discovered and the data appear to be missing at random (MAR)¹². The size of the sample analysed in regression is 988 cases if missings are deleted listwise. The group of cases which are deleted in a complete-case analysis is statistically significantly different from the group left in the analyses regarding age (Mann-Whitney U test, sig. <0.001 for both groups given the dependent variable) and political orientation (chi-square test sig. <0.001 for both groups given the dependent variable). This violates the assumption that data are missing completely at random. Moreover, missingness in several items of independent variables is related to some items of dependent variables (e.g. answers for willingness to sacrifice items are statistically significantly – chi-square test sig <0.001 – different for those not answering to what degree they consider global warming dangerous). Proceeding with complete-case analyses could in this case lead to biased estimates (Allison, 2002). Therefore, missing data in scale items (not socio-demographics such as education) were imputed using the multiple imputation method.¹³ All analyses were conducted on both imputed and original data. The results are uniform – the estimates in both analyses differ only slightly. Therefore, results for complete-case analysis are presented throughout the paper. The key demographic and socio-economic properties of the representative sample are presented in Table 7.

¹¹ Sampling levels were: stratified probability sampling of residential areas, stratified sampling of households, Kish table based selection of household member.

¹² Missing at random here references to Rubin's commonly used denotation of patterns of missingness (Allison, 2002; Graham, 2009; Leite & Beretvas, 2010; Roth, 1994; Schafer & Graham, 2002; Sinharay, Stern, & Russell, 2001). Compared to *missing completely at random* (MCAR) which is what we usually intuitively understand as *random*, i.e. missing data are not related to either observed nor unobserved cases, MAR means that missing data are related to observed values, but we assume that they are not related to unobserved values. The assumption of MAR cannot be proved since missing data are not available to analyse.

¹³ Data were imputed with 20 imputations by 50 iterations utilizing Fully Conditional Specification method provided by Multiple imputation tool build in the SPSS Statistics v19 software. Predictive Mean Matching was used for scale variables. Likert-type scales were treated as scale variables in the imputation process, since the method is robust towards violations of normality and continuity assumptions (Leite & Beretvas, 2010). One case was deleted from the dataset since the respondent did not answer all sub questions of the key variables. The imputation model included all variables used in the analyses and other related variables present in the questionnaire.

Table 7 : Sample characteristics (original weighted data; $n=1427$)

7. Sample characteristics (original weighted data, <i>n</i> = 1127)					
count	%		count	%	
Age			Education		
18 – 29	283	19.8	primary	725	50.8
30 – 44	408	28.6	secondary	508	35.6
45 – 59	353	24.8	tertiary	194	13.6
60 and over	383	26.8	Monthly net household income (<i>n</i> =891) ^a		
Gender			up to 15 000 CZK	298	20.9
female	693	48.6	15 001 – 30 000	365	25.6
male	734	51.4	30 001 – 45 000	163	11.4
Subjective status (<i>n</i> =1375) (S.E.)			45 000 and more	64	4.6
Mean	4.73	(0.046)	Political orientation (<i>n</i> =1173) (S.E.)		
sd	1.713	Min=0	Mean	5.06	(0.07)
+ Don't know	32	Max=10	sd	2.412	Min=0
+ No answer	20		+ Don't know/Refuse	190	Max=10
			+ No answer	63	

^a Percent of sample $n=1427$

Several studies have analysed the ISSP Environment dataset used in this paper. Most frequently, the research has focused on environmental attitudes or environmental concern in a comparative way both internationally and in time (Franzen & Meyer, 2010; Franzen & Vogl, 2013b; Hadler & Wohlkönig, 2012; Marquart-Pyatt, 2012b, 2012a; Olofsson & Ohman, 2006; for analysis of the Czech data see Řeháková, 2001; Soukup, 2001; Soukup & Jandová, 2001). Some authors analysed the predictors of willingness to sacrifice (Haller & Hadler, 2008), i.e. willingness to make economic/financial sacrifices (Gelissen, 2007; Harring, 2013) or willingness to pay (Ivanova & Tranter, 2008). Inglehart's (1977) concept of postmaterialist value orientation, education, environmental concern or risk perception (Gelissen, 2007; Ivanova & Tranter, 2008), income (Gelissen, 2007; Haller & Hadler, 2008), and age (Gelissen, 2007) have been identified as influencing willingness to make economic sacrifices. However, no study has analysed actual policy acceptability since no such question is included in the international module of the ISSP; it is however present in the Czech version. Therefore, only data for the Czech Republic are analysed with special regard to the national policy context.

Variables

Given the fact that the ISSP Environment module does not contain any constructs of existing social-psychological models (see section 4.1), no such model can be tested in this study. However, the role of several social-psychological constructs is examined *ad hoc*; particularly general social and more specific political trust, preferences regarding the role of the state in environmental protection, environmental concern and postmaterialist value orientation. The means of constructed scales and wordings of questions and scale items are presented in Table 21 in the Appendix to this study. The independent variables were chosen based on the results of previous studies of the same dataset (see above) and on an extensive literature review on factors influencing public responses to policies provided in Chapter 4.

The *policy acceptability* scale was constructed as an average score on three 5-point Likert items¹⁴ assessing the acceptability for three different policy instruments, namely an ecological

¹⁴ The item scale ranged from 1 (definitely support) to 5 (definitely not support). It is worth noting that such a scale is intrinsically one-dimensional – there is no opposition in the phrasing of the item scale, only lack of support. The scales were inversely recoded for the sake of interpretation lucidity.

tax for polluting businesses, support for renewable energy sources (RES) by feed-in tariffs, and improving energy efficiency by financial support for residential home thermal insulation (see for example Bostrom et al., 2012; Schmöcker et al., 2012; Zahran et al., 2006 for examples of similar measurement of policy acceptability). The Czech equivalent of the term *support* was used in the question wording of the dependent variable used in this study. Moreover, the general instruments named in the questionnaire are already implemented or were implemented at the time of data collection. However, the concept measured by the question is closer to *acceptability* as it is rather attitudinal and the question is hypothetical without regard to the actual state of the policy or respondents' knowledge of it. In consequence, the term *acceptability* refers to the dependent variable despite the translation issue.

Second, a *willingness to sacrifice* scale was constructed as an average of three 5-point Likert item scores on willingness to pay higher prices, willingness to pay higher taxes and willingness to accept lower living standard.

Two items of *general social trust* (Spearman-Brown statistic for consistency of two-item scales is 0.815 indicating sufficient consistency) and one item of *political trust* were used for the key explanatory variables. Although there are two items on political trust in the questionnaire, their internal consistency was low (Spearman-Brown statistic 0.584) and hence only one was chosen for regression analyses to avoid multicollinearity problems, namely level of respondent's agreement with statement that politicians are motivated solely by self-interest.

Several items were inspected regarding the concept of environmental values or worldview¹⁵ but no possible set yielded a satisfyingly consistent scale or sufficiently high inter-item correlations¹⁶. However, two other related scales were constructed: environmental concern (perception of environmental risks) and perception of one's own capacity to act (self-efficacy or locus of control). Five items out of seven in total were used for the *environmental concern scale* (Cronbach's alpha 0.781). The two excluded items concerned GMO and nuclear energy, two topics which are rather controversial in the Czech Republic (GMO is not yet well known among the public; thus, a high rate of missing data is present in this question, and the nuclear energy is often presented as a "green" energy solution, hence not always regarded as an environmental threat). Other five items from seven in total served the construction of the *self-efficacy scale* (Cronbach's alpha 0.723). The ISSP includes two variables to measure postmaterialist value orientation as conceptualised by Inglehart (1997). The indicator was construed consistently with usual practice (Řeháková, 2001; e.g. Soukup, 2001). Respondents were given four options when answering the questions what is the most and second most important priority for the Czech Republic: maintaining order in the nation, giving people more say in important government decisions, fighting rising prices, and protecting freedom of speech. The first and third options are regarded as materialist priorities, while the second and fourth as postmaterialist ones. Individuals were coded as materialists if they chose any of the materialist priorities in both questions or as postmaterialist if they chose opposite in both questions. If combination of postmaterialist and materialist priority in any order was chosen, the respondent was coded as "mixed".

¹⁵ Unfortunately, the complete New Environmental Paradigm scale widely used to measure environmental values was not included in the questionnaire. The research on policy acceptability however suggests it has predictive power (Attari et al. 2009; Bord, O'Connor, and Fisher 2000; Shwom et al. 2010; Steg et al. 2011).

¹⁶ Criteria for the internal consistency of scale were Cronbach's alpha equal or higher than 0.7 and inter-item correlations equal or higher than 0.5.

Respondents' preferences regarding the *role of the state* in the protection of the environment were assessed in two binary-choice questions on whether the state should let citizens to decide how to protect the environment or rather pass some laws to ensure the protection. Same two options were posed for businesses and their behaviour. Further, *right-left political orientation* was measured on 11-point scale.

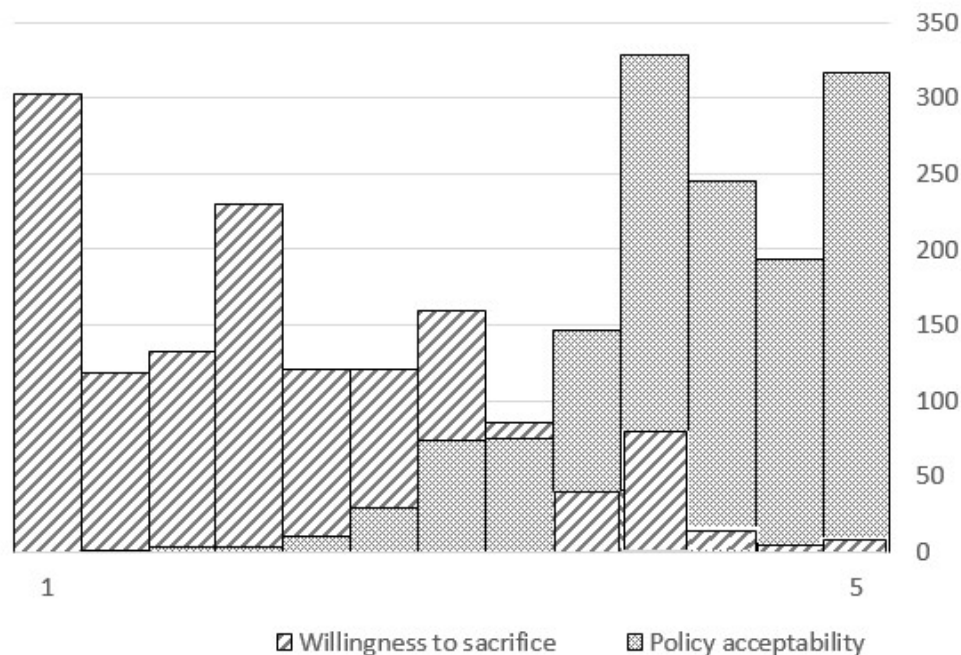
The standard socio-demographic variables such as *gender*, *age*, and *education* were included in the models. *Income*, with a large proportion of missing data with high probability of missing data being not at random (individuals with higher or lower income may opt not to report its level), was substituted by *self-assessed social class membership* measured on 11-point scale. It can reasonably be assumed that the perception of one's status and wealth, as a proxy for subjective ability to pay, is at least equally important for the willingness to sacrifice some amount of money or comfort as the actual income. All question wordings and means are presented in the Appendix.

Analysis

In the first step, a model, developed in line with the literature review results, social-psychological theories, possibilities given by the ISSP questionnaire, and correlation analysis (see Table 22 in Appendix to this study) is tested by OLS regression analysis. Socio-demographic characteristics of the respondent (gender, age, subjective assessment of social status, education) and social-psychological constructs as introduced earlier (environmental concern, self-efficacy, general post/materialist values, general trust and trust towards politicians, and preferences for the role of the state) are included as independent variables. The model is used for analysis of policy acceptability and willingness to sacrifice.

No independent variable posed a collinearity problem in the models (based on variance inflation factor – VIF, and values of tolerance with criteria set to not higher than 3 and not lower than 0.3 respectively; (Field, 2013, p. 196). However, the dependent variables are severely skewed, as may be clearly seen in Figure 1. This contributes to violation of assumption of residuals homoscedasticity in both models. Unfortunately, no transformation of the dependent variables could amend the problem. Therefore, ordinal regression for policy acceptability and multinomial logistic regression for willingness to make economic sacrifices (the ordinal model of willingness to sacrifice failed the test of parallel lines) were computed to check the validity of results of OLS regression. Both models yielded the same results, i.e. the same factors were flagged as statistically significant as in the linear regression, hence the OLS estimates are presented in the text for the sake of readability of interpretation. The level of $\alpha=0.05$ has been chosen for interpretation of regression results. SPSS Statistics version 17 was used for the analyses.

Figure 3: Histogram of policy acceptability and willingness to sacrifice – general indicators distributions (original data; $n=1427$)



a statistically significant relationship to policy acceptability. The negative effect of age is not large. Still, younger respondents tend to be slightly more in favour of proposed policies.

Consistent with previous research on various types of environmentally significant behaviour (see above) environmental concern has a statistically significant positive effect, as expected – those who are more concerned about environmental risks are also more likely to accept environmental policies. Interestingly, general materialist or postmaterialist value orientation has no effect on policy acceptability. Neither has general social trust. Specific trust toward politicians, on the other hand, has statistically significant effect. Surprisingly, this effect is opposite than expected – those who agree with the statement that politicians are in politics only for what they can get out of it personally are more likely to accept environmental policies compared to the reference middle category (nor agreement or disagreement). Disagreement with the statement does not relate to change in acceptability. It is hard to judge what may the cause of this unexpected effect be, but one suggestion could be that regulation and policies are a kind of insurance or instruments to control the behaviour of others, including the politicians whom we may not trust. The preferences regarding the regulations of environmental protection for citizens and businesses have positive effect on policy acceptability. Those who prefer state regulations for both citizens and businesses are more likely to accept the policies. This is in accordance with expectations. No other independent variable has statistically significant effect.

Table 8: Results for regression models (original weighted data; $n=988$)

	Policy acceptability				Willingness to sacrifice			
	Beta	sig.	CI (95%)		Beta	sig.	CI (95%)	
Subjective status	-0.006	0.860	-0.030	0.025	0.157	0.000	0.054	0.129
Political orientation	-0.007	0.834	-0.021	0.017	0.087	0.006	0.010	0.062
Age	-0.134	0.000	-0.008	-0.003	-0.022	0.461	-0.005	0.002
Social trust	-0.040	0.191	-0.070	0.014	0.115	0.000	0.058	0.172
Environmental concern	0.309	0.000	0.259	0.388	0.160	0.000	0.155	0.331
Self-efficacy	0.012	0.701	-0.047	0.070	0.245	0.000	0.245	0.403
Politicians self-interested (agrees) ^a	0.134	0.000	0.096	0.301	-0.097	0.004	-0.343	-0.067
Politicians self-interested (disagrees) ^a	0.030	0.383	-0.083	0.215	-0.048	0.134	-0.354	0.047
Secondary education ^b	-0.039	0.255	-0.146	0.039	-0.013	0.679	-0.151	0.098
Tertiary education ^b	0.009	0.804	-0.114	0.147	0.042	0.199	-0.061	0.292
Female ^c	-0.002	0.941	-0.082	0.076	0.051	0.068	-0.007	0.206
Mixed preference for role of the state ^d	-0.044	0.251	-0.195	0.051	-0.046	0.207	-0.274	0.060
Preference for state regulation ^d	0.125	0.002	0.066	0.279	0.019	0.605	-0.107	0.183
Mixed value type ^e	-0.009	0.766	-0.098	0.072	0.086	0.004	0.055	0.285
Postmaterialist ^e	-0.020	0.536	-0.216	0.112	0.069	0.021	0.039	0.486
Constant	3.105	0.000	2.755	3.455	-0.525	0.030	-0.998	-0.052
Adjusted R ²	0.164				0.265			

^a reference category *neither agree or disagree*; ^b reference category *primary education*

^c reference category *male*; ^d reference category *preference for individual action*

^e reference category *materialist*

Willingness to sacrifice

The model for willingness to sacrifice has a relatively higher explanatory power. More factors also have statistically significant coefficients. As expected, subjective social status has a statistically significant influence. No demographic variable does. Besides the statistically significant positive effect of environmental concern, there is a very small, yet statistically significant, effect of postmaterialist value orientation. To be precise, those who are coded as either mixed (i.e., have chosen one materialist and one postmaterialist priority) or as postmaterialist are slightly more likely to be willing to make economic sacrifices than materialists. Furthermore, the preferences regarding the role of the state in environmental protection have no impact, although paying higher prices or taxes implies existence of some policy.

The self-efficacy variable, reflecting perceived personal barriers to behave environmentally friendly, has a positive effect on willingness to make economic sacrifices. Those who feel less infringed by perceived barriers to act pro-environmentally are more likely to be willing to pay higher taxes or prices or accept lower living standard. This supports the idea that policy acceptability is more of an attitudinal construct, while willingness to sacrifice is closer to the conative aspect of environmental attitudes (see for example Franzen & Meyer, 2010).

Both general social trust and trust in politicians have statistically significant effect, but the latter is negligible. The positive effect of general social trust might be surprising, given that it had no statistically significant effect on policy acceptability. This could be related to the stakes vested in the willingness to make economic sacrifices – as they are higher than in the case of simply accepting some policy, trust towards others is more decisive. Harring and Jagers (2013) argue that environmental problems are social dilemmas laden with the free-rider problem and moreover, short-time benefits are usually preferred over the long-time ones. In such a circumstance, trust toward fellow citizens is crucial for one's own action. 41% of the respondents in the present study agreed that it is not worth acting pro-environmentally unless other people contribute as well. This supports the idea that more specific assessment of trust toward fellow citizens is needed.

3.3.4. Discussion and conclusions

The aim of this study was to identify and compare the sets of factors influencing acceptability of environmental policies and willingness to make economic sacrifices (willingness to pay higher prices or taxes or to accept lower living standard). Both indicators have been used to measure policy responses in previous studies (see above). Although the regression models have only modest fit, the results clearly indicate the differences in the set of influential factors between them. In this regard, it is necessary to take into consideration the different nature of each indicator as measured in the ISSP questionnaire. While policy acceptability as measured in the Czech ISSP survey is purely evaluative, willingness to make economic sacrifices is a measure of intent. The results support this conceptual difference – the effect of perceived self-efficacy, i.e. perceived barrier to act, is statistically significant for willingness to sacrifice, but not for acceptability of environmental policies.

The measures also differ with respect to financial costs stated in the questions. This is projected into the relationships with subjective social status. Naturally, variables implying the cost to citizens, as in the willingness to pay much higher prices or taxes questions, are positively affected by higher subjective social status. However, policy acceptability was

assessed without any mention of costs of implementing the policy, while willingness to sacrifice is mainly based on financial sacrifices. Yet these two are in fact inherently related. Higher prices of products (principally followed by a decrease in living standard as the household has less money to spend on other goods) are usually an indirect effect of higher taxes imposed on businesses. Higher taxes, on the other hand, are usually a tool for collecting money earmarked to subsidies, such as those for residential homes thermal insulation.

It seems though that respondents are not aware of this connection as such awareness would presumably lower the acceptability of policies and would at least partially manifest in a relationship between acceptability and willingness to sacrifice – a relationship which is now absent. According to Rhodes and Jaccard (2013) policy acceptance is influenced by the visibility of costs. They show in their case study that the clean electricity regulation policy in British Columbia gained better acceptance by the public, because its costs were unseen or invisible to the general public, while the acceptance of carbon tax was lower as people were generally aware of its costs. This is, although indirectly, supported by the results of this study – high acceptability of three different policies is in a striking opposition to strong reluctance to sacrifice either money or comfort. On the other hand, specification of minor costs can also increase acceptability where the initial level of acceptability is low (or opposition is present). This could be, for example, the case of taxes, which are generally disliked by public, and the costs people associate with them could be expected higher (Lachapelle, Borick, & Rabe, 2012).

There is no statistical relationship between the indicators of policy acceptability and willingness to sacrifice. This points to the terminological and conceptual disparities of policy support or acceptability definition and measurement. Both measures used in this study can be found in empirical studies as measures of policy acceptability, but as clearly shown, both yield very different results (including different set of influential factors). Including money or the actual effects policy would have on respondent's life may change the course of consideration and the overall outcome of the question. On the other hand, general willingness to make economic sacrifices lacks any specification of policy or instrument attributes.

Policy instruments can be defined on different levels of specificity and with many different characteristics. It seems that measuring acceptability by asking about general environmental policies, or even more problematically about environmental policy in general, will yield results positively biased towards higher levels of acceptability or support. Policy responses should be measured while respondents are aware of the actual (economical) consequences of the policy at hand (see also Lachapelle et al., 2012) and the mechanisms involved. Stated preference methods applied by economists (see for example Cai et al., 2010; Cole & Brännlund, 2009; S. Dietz & Atkinson, 2010) offer the possibility to assess policy acceptability with regard to policy attributes, context and cost and allow for computing the exact financial value of policy attributes (such as effectiveness, instrument characteristics, cost distribution, revenue use or policy label) and thus allow a comparison between contexts and attributes (see Alló & Loureiro, 2014; Nemet & Johnson, 2010; for review Zvěřinová et al., 2014). A multidisciplinary approach with attention to context-specific factors is recommended for future inquiries in policy acceptability and support.

The analysis confirmed several factors previously identified as influencing responses to environmental policies in general in the Czech Republic, namely environmental concern, preference for state regulation, and age. However, postmaterialist value orientation has no statistically significant effect in the Czech data. This is consistent with results of Hadler and

Wohlkönig (2012) for the public environmental behaviour (such as petitioning) and for private environmental behaviour (such as recycling).

Regarding the role of trust, the results open several questions for future research. First, general social trust appears to have no effect on general policy acceptability, while scepticism towards politicians' motivations is positively related to acceptability. Effects of different measures of trust, both general social and institutional and toward policy-makers should be assessed as more complex relationships may be uncovered. Specifically, phrasing targeted at the expectation that others would act responsibly or comply with the policy seems like a good start (see for example Harring & Jagers, 2013).

In the context of the Czech Republic and its history of rather controversial implementation of environmental policies, the high levels of positive attitudes towards presented policies, although presumably positively biased, hold some hope for overall positive perceptions of the endeavour to save the environment with the help of policy instruments, although it is clear that the Czech public is not willing to sacrifice much to help the cause.

3.4. Summary and recommendations

The present chapter focused on conceptual and operational definitions of diverse policy responses, such as policy acceptability, acceptance, and support and their methodological context and implications. A considerable diversity in adopted measures and lack of clear operational definitions grounded in well-defined theoretical concepts is currently the state of the art in research of public responses to climate policies (but also in other policy fields). The terms and concepts are used interchangeably and only very limited attention is paid to the methodological issues of concept definition and measurement.

This diversity is an effect of the relative youth of this field and the learning process in which measures are revised based on previous mistakes, issues, and results. It is, however, also a testimony of the current scientific practice and project-oriented financing. A demand for studies in climate policy attitudes has increased in response to increasing saliency and political importance of climate action in global. One-shot projects delivering results applicable in policy making are funded with no time or money left for more nuanced, but needed, methodological and conceptual considerations and studies. Reviewing the growing amount of empirical studies is daunting and most do not deal with methodological issues such as ensuring validity of employed measures. In consequence, cumulating knowledge in terms of both results and informed methodological decisions in such a diverse and quickly evolving field is a challenge.

In response to this state and practice, the three most prevalent terms were overviewed with respect to possible conceptual differences or commonalities. Based on the definition of the core concept of attitudes, the three constructs are proposed to be different and possibly empirically distinguishable classes of attitude responses, i.e., expressions of psychological tendency to evaluate a given entity: a climate change mitigation policy in this case.

The existing terms as classes of responses have, if carefully applied, their utility. However, omitting many other possible attitudinal and behavioural responses has so far been a major weakness of current research. Existing measures limit conclusions to only a small subset of possible responses, therefore reflecting reality only partially, providing incomplete and maybe even misleading results. Other possible responses should therefore be examined and included in research designs, but with careful embedding in core concepts of attitudes and consideration of possible links to other responses. These methodological issues further represent a large and challenging task for future research.

The possibility of considerable gaps between results obtained by different measures was exemplified by a study comparing composite indicators of willingness to make economic sacrifices on behalf of environmental protection and general acceptability of environmental policies. The results show no correlations between the two measures and regression analyses indicate different set of explanatory factors. These results point to the need to distinguish between different public responses and to empirically assess relationships of these responses.

In the remainder of this closing section, some general recommendations for constructing measures of attitudes toward climate (and environmental) policies and for interpreting results are proposed. Similar to Dunlap's and Jones's (2001) distinction of four categories of measuring instruments of environmental concern, policy responses can be measured in four rather distinct ways corresponding to different research goals: 1) policy general or multiple-policy multiple-response instruments examining several responses to several different policies; 2) policy general or multiple-policy single-response instruments focusing on one

specific type or class of responses and several policies or policy effort in general; 3) single-policy multi-response instruments evaluating different responses to a specific policy proposal or instrument; and 4) single-policy single response measures measuring a specific response to a specific policy formulation.

Researchers should carefully consider what responses to the proposed policies to measure. If the research question is formulated with a specific response in mind, then the measure should adhere to it. If, on the other hand, a specific response is not the subject, a multitude of them should be included at least in the pre-survey. By limiting the scope to responses such as passive acceptance or more active support as compared to opposition or others, the research omits a large share of the reality of policy attitudes.

Two approaches to defining climate policy as an attitude object were distinguished in this chapter. One group of studies aims at measuring and explaining an overall attitude to governmental action on climate change, while other studies focus on policy-specific attitudes. With their diverse aims these approaches have utility, but researchers should be clear about these aims and formulate the measures and interpret the results accordingly.

Both approaches have certain limitations which should be reflected in the interpretation of results. First, citizens' attitudes toward governmental climate action in general have a limited applicability on policy-specific situations. Researchers should be aware of the possibility of value-implementation gap and increased error due to unobserved variables entering the respondents' considerations (i.e., respondents' own specifications and examples of the general object which is presented to them).

Second, policy-specific attitudes are context and formulation-dependent and special attention needs to be paid to formulation and wording of the proposed policies and the survey questions introducing them. In this regard, information about costs of a proposed policy should be provided to respondents. Since specific levels of costs can have diverse and often hardly predictable effects on respondents' answers (see later in the section 4.3), costs should be mentioned at least in general terms, e.g., by pointing out that the respondents themselves would bear some of the costs indirectly through higher prices of daily products.

Next, the formulation of the proposed policy should be based on the results of previous studies examining similar policies and a pilot or pre-surveys exploring the meanings respondents associate with different labels or policy characteristics. Even the common or prevalent policy formulation as used in official documents, academic debates, and media carry meanings which can introduce unobserved biases or effects into results. Diverting from the common terms and ways used to describe the examined policy can also have surprising benefits if the goal is to formulate a viable communication strategy.

Qualitative pre-surveys should also be used to elicit policy characteristics important to citizens in each context if there are no specific characteristics important to the researchers or policy-makers. In short, policy-specific measures should be formulated with consideration of either the policy attributes important for the research goal, or for the target population.

With respect to measuring attitudes toward governmental mitigation action in general, composite measures are usually preferable to single items formulated with vague terms. With such general questions, researchers lose any control of what policies are considered by the respondents. Moreover, using multiple items presenting a diversity of climate policies can bring more interesting results and point to inconsistencies of evaluations of specific policies and policy instruments.

Given the complexity of environmental attitudes, contextual dependency, and technological intricacy of climate change mitigation policy, diverse approaches are needed to unfold how people think about policies, process relevant and provided information, and arrive to conclusions which then can lead to decisions and actions (and how this relationship may work) (McCarney & Schrekhise, 1999). Methodological diversity should, however, not be confused with methodological obfuscation, vagueness, or unclarity. Although diversity in definitions can be fruitful by leading to different considerations and approaches to problems (or even identifying new, previously unrecognized problems), absence of definitions on the other hand often leads to misinterpretation and misleading conclusions.

4. Review of factors related to public responses to mitigation policies

As discussed in the previous chapter, studies of public responses to climate change and environmental policies are growing in numbers, yet meaningful synthesis of the results obtained in those studies is hindered by conceptual and methodological diversity and vagueness. There are few recent reviews summarizing the voluminous evidence on attitudes toward transport measures (Pridmore & Miola, 2011), particularly transport pricing (Jaensirisak, Wardman, & May, 2005; Steg & Schuitema, 2007), energy policy (Steg et al., 2005; Steg, Dreijerink, & Abrahamse, 2006), and environmental taxes (Sælen & Kallbekken, 2011). Alló and Loureiro (2014) conducted a meta-analysis of contingent valuation studies, and Nemet and Johnson (2010) previously conducted a review of stated preference studies estimating WTP for climate policies.

Most recently, Drews and van der Bergh (2015) conducted a systematic review of empirical studies examining public responses to climate policies. The authors opted for the same methods and criteria for the review as presented and used in this dissertation.¹⁸ They did a good job summarizing the results of existing studies. With raising caution to the diversity of policies and measures used in the research, they concluded that left-wing and green political orientation, environmental and self-transcending values, egalitarian worldviews, problem awareness (concern over climate change, knowledge about climate change), and emotions such as worry, interest, and hope may all positively influence policy attitudes. Next, policy characteristics play an important role: policies perceived as effective and fairly distributing costs, as well as less coercive pull measures can improve policy evaluation. Among more contextual factors (or individual evaluation of the context), trust toward policy makers or politicians, economic situation of the country, vulnerability and exposure to climate change impacts, and experience with extreme weather may also influence public responses to climate policies.

Drews and van der Bergh (2015) merely summarize results of a variety of studies on diverse policies from different domains using different policy instruments and generalise the conclusions with no further theoretical outtake. Nevertheless, since the results, methodologies, tested models, and variables are very diverse, a common framework could be beneficial for future research practice. Although this review uses data largely overlapping with studies reviewed by Drews and van der Bergh (2015), it presents a new take on the results.

The aim of the review is to propose a general framework, which would serve to anchor the existing results and aid new research by pointing out unanswered questions and empty areas, including the need for context-dependent and policy-specific research. The framework is not meant to be applied universally, but with respect to context, measurement, and policy specification. In this respect, the corner-stone questions of this review are: What are the key theories and models of policy attitudes and how successful they are in explaining these attitudes? What are the factors related to public responses to climate change mitigation policies?

¹⁸ The two reviews were conducted independently and with no awareness of each other. The review presented in this dissertation was started in 2013 and first outputs were published within the CECILIA2050 project (Zvěřinová, Ščasný, & Kyselá, 2014), where studies up to the year 2014 were overviewed.

Any framework attempting to assess policy responses needs to accommodate for the diversity of attitude objects and their specifications, i.e., policy characteristics, and the diversity of the possible responses. Given the volume of the literature and the diversity of scientific results and conclusions on the topic, the focus of the review is narrowed to two types of studies as identified previously: 1) studies of public responses to climate change mitigation policies in general (measured by generally-worded questions or by batteries), and 2) studies of public responses to taxes levied on climate change mitigation. This narrowing increases comparability of the results within the two groups and hence facilitates synthesis. Furthermore, it allows for comparison between the two groups in terms of factors related to dependent variables. Such comparison can help to unfold commonality of some factors and diversity among others. In this respect, the review aims to account for the diversity in factors related to diverse responses to different policies. First, the goal is to identify factors common to both studied types of policies. Second, factors which are not common are discussed in their specific contexts.

The present diversity of approaches and variables requires a systemic approach and structuring. For that purpose, the review and the proposed framework stem from the model of the Value-Belief-Norm theory of environmentally significant behaviour. The model was chosen based on its overall good performance and suitability for application in this field, as is reviewed and discussed in the following section. The review therefore summarizes empirical evidence in relation to the concepts and relationships proposed within the model and its possible development into a broader framework applicable to attitudes and responses to climate change policies. Furthermore, variables originally not proposed to be a part of the model but identified in the review as important as common factors or in specific contexts are identified and included in the framework.

The review, in general, follows the goals of the proposed framework, which are to offer a tool to facilitate measurement and explanation of policy attitudes, interpretation of existing and future results, cumulation of knowledge gained in research, and finally, to formulate policy relevant recommendations for policy making, communication, and for changing policy attitudes and public responses.

The following section overviews general approaches explaining climate policy attitudes, the focus of these approaches regarding the diverse explanatory factors, and their possible limitations. The second section of this chapter presents, in a nutshell, the VBN theory and its model. Related to the model and the concepts included in it, the section also examines different value-based and related factors, including social emotion, political orientation, and social norms. In the third section, policy specific beliefs and considerations of policy characteristics are discussed. Two empirical studies are included in the present chapter – one on diverse effects of temporal and spatial framing among the segments of Norwegian population distinguished by respondents' political orientation, and the second on associations of some of the overviewed factors with policy specific beliefs, namely perceived effectiveness and coerciveness. The results from study 1, presented in chapter 3, are also discussed in the review.

4.1. Approaches to policy acceptability research¹⁹

Several dominant disciplinary and theoretical approaches can be recognized within the domain of research on climate policy attitudes. First, a distinction based on the nature of the dependent variable and the goals of the studies has already been made earlier in this dissertation. All studies aim at understanding policy attitudes, but one group focuses on attitudes toward climate policies or governmental action in general, while the other investigates policy-specific attitudes. Although this distinction is rarely made explicit, if at all, the potential utility of the results provided by these two groups is different. In the first case, general conclusions applicable to any climate or environmental policy are sought. In the latter group, the utility of the results lies in a policy-specific advice. This distinction has already been argued for in chapter 3.

Second, a considerable diversity is present with respect to methods and analytical approaches. Most reviewed studies analyse cross-sectional survey data on either representative or convenience population samples. Some studies conduct survey or laboratory experiments and few analyse either referendum data or take a qualitative approach (focus groups, interviews). Since the aim of this review is to overview factors related to policy attitudes considering context and existing variations in measurement, situation, and definitions, such methodological variability is beneficial, although it reduces comparability of the results.

Third, most of the reviewed studies do not stem from a consistent theoretical background or employ a theoretically based model (see also Kallbekken & Sælen, 2011). Different theories are applied to answer diverse questions or test different hypotheses. Similar to the situation in research on predictors of individual views of climate change, as described by Shwom and colleagues (Shwom et al., 2015), a large share of research on policy attitudes is not driven by any single one overarching theoretical perspective. Economy, social psychology, and sociology usually take different theoretical approaches, although some multidisciplinary studies have already been published (e.g., Hansla et al., 2008; Uehleke, 2016). While economic studies are in general more concerned with preferences for various characteristics of the policies, (social-)psychological studies and few sociological studies deal in depth with individual factors, such as values, attitudes, and personal norms. Both economic and (social-)psychological studies are usually embedded in established theories.

Economic studies using stated preference methods (T. C. Brown, 2003; only two studies claim to use revealed preferences methods – Cherry, Kallbekken, & Kroll, 2012; Löschel, Sturm, & Vogt, 2010) stem from utility theory (Fishburn, 1968) based in general assumptions about the nature of preferences as discussed in section 3.2). The assumed preference structure (based on axioms of transitivity, context independence, and others) can be transformed into a numerical utility structure (Fishburn, 1968). Hence, many stated preference studies reviewed in this text compute values of willingness to pay (WTP) for different climate policies and their attributes. Methods and models of such computations are not discussed here, since the focus of this review is on results and explanatory factors. Moreover, the stated willingness to pay is regarded here as an indicator of the underlying attitudes, similar to other measures discussed in the previous chapter. Several studies using

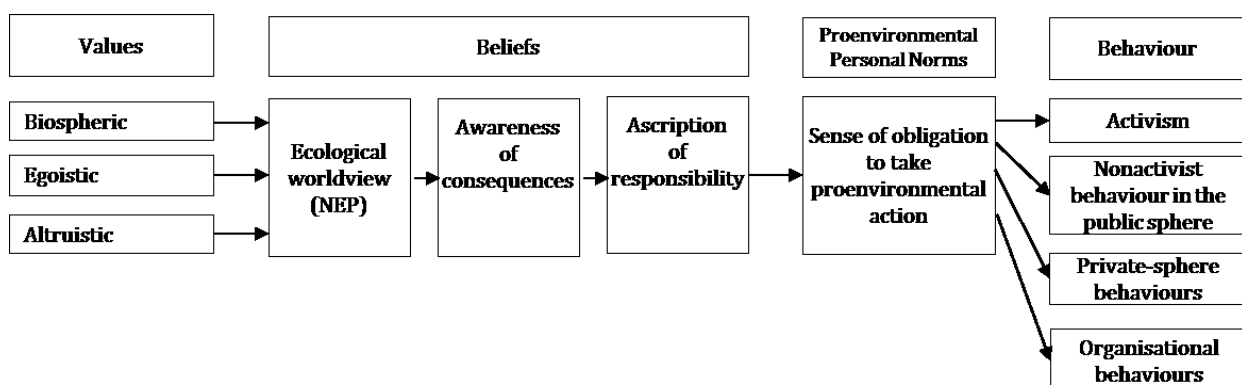
¹⁹ Parts of this section have been revised and published in collaboration with co-authors as CECILIA2050 project report: Zvěřinová, I., Ščasný, M., & Kyselá, E. (2014). *What Influences Public Acceptance of the Current Policies to Reduce GHG Emissions?* (WP2 Deliverable 2.5.). Prague: Charles University Environment Center. Retrieved from <http://cecilia2050.eu/publications/239>

some of the stated preference methods do not calculate values of WTP or do not report them. They rather treat WTP as a dependent variable in the statistical analyses (e.g., Carson, Louviere, & Wei, 2010; Hansla et al., 2008; Hersch & Viscusi, 2005, 2006). The choice of explanatory factors is often based on results of previous research and is *ad hoc*, while more elaborated theoretical models are applied only rarely (e.g., Hansla et al., 2008; Uehleke, 2016 combine stated preference methods with the model of the Value-Belief-Norm theory; see below).

From the many social-psychological models of environmentally significant behaviour (see Jackson, 2005 for overview), only few were used in the reviewed studies. Namely the Theory of Planned Behavior (TPB; and Theory of Reasoned Action – TRA, Ajzen, 1985, 1991; Ajzen & Fishbein, 1980), the ABC theory (Stern, 2000), some versions of the cultural theory, and above all the Value-Belief-Norm theory (VBN; and the Norm Activation Model – NAM, Stern, 2000; Stern et al., 1999; Stern, Kalof, Dietz, & Guagnano, 1995). The theories are usually applied only partially or modified, sometimes combined (e.g., Schade & Schlag, 2000, 2003). The VBN theory model will serve as a starting point and an organizing framework in the following review and is therefore overviewed in more detail.

The VBN model integrates three existing theoretical concepts in a causal order: the value theory, the NEP scale (New Environmental/Ecological Paradigm), and the norm activation theory represented by Schwartz's (1977) Norm Activation Model (NAM). The causal chain (Figure 4) leads from general values (biospheric, altruistic, or egoistic) to more specific attitudes towards the environment and nature, measured by the NEP scale (Dunlap, Liere, Mertig, & Jones, 2000). Based on these values and attitudes, individuals consider the consequences of the environmental problem, climate change in this instance, for themselves, others, or their natural environment (awareness of consequences). If individuals believe that their environmental conditions significantly and negatively affect their lives, lives of others or their environment, and that their actions can avert these consequences (in other words they ascribe the responsibility to act to themselves), a set of norms for protection of (at least their own) living environment is activated, accompanied by a sense of responsibility to oblige. These norms and feelings consequently lead to the performance of behaviours beneficial to the environment (Figure 4).

Figure 4: Value-Belief-Norm Theory model (Stern, 2000, p. 412)



In the present review, only two studies use the complete causal model of the VBN theory (see Figure 4). Other studies use some of the concepts, sometimes supplemented by variables from another approaches or models, or by variables added *ad hoc*, as for example policy specific beliefs including perceived fairness and effectiveness of policies. The causality between variables has been tested by regression analyses, path analyses (Eriksson et al., 2006; Eriksson, Garvill, & Nordlund, 2008), and structural equation modelling (T. Dietz et al., 2007; Joireman & Liu, 2014; Nordfjærn & Rundmo, 2015; Poortinga, Spence, Demski, & Pidgeon, 2012).

Despite some diversity in the application and modification of the model, the results support the theory and the proposed relationships between the variables. Steg, Dreijerink, and Abrahamse (2005) and Harring and Jagers (2013) applied the complete VBN theory model on attitudes toward energy policies and taxes respectively. Both studies evaluated the performance of the model as good (the R^2 was 0.32 in the first study and adjusted R^2 was 0.138 in the second). More importantly, both deemed the causal chain of the model valid (although neither of these two studies tested the model by structural equation modelling). All variables of the original model applied together significantly contributed to the model. Poortinga and colleagues (2012) applied the model on energy related behaviours in private sphere and on support for energy-supply technologies and concluded that the model explains the former better than the latter. Several other studies furthermore report moderate amounts of variance explained by variables in modified models of the VBN theory, particularly personal norm which mediates the effect of other variables (Eriksson et al., 2008; Steg et al., 2005; and T. Dietz et al., 2007; Eriksson et al., 2006 who included also measures of policy effectiveness and fairness).

Steg and Vlek (2009) argued that the model is more suitable for predicting behaviour involving smaller costs or the intentions leading to some behaviour, as for example willingness to pay, intention to change one's behaviour, or support for policies. In cases where the stakes are higher and the behavioural change involves higher costs, the model's predictive power is smaller. Stern (2000) is aware of this partial weakness and recommends enhancing the VBN model with concepts from the ABC theory model (see Stern, 2000)²⁰.

There have been attempts and propositions to combine several social-psychological models (mostly VBN and TPB; e.g. Klöckner, 2013) in order to enhance the explanatory power and to deal with the criticism concerning omitting possible important explanatory factors, for example habit or contextual variables (Urban & Braun-Kohlová, 2008). On the other hand, no attempt has so far been made to propose an integrated theoretical framework or model to explain or predict climate or environmental policy attitudes (Eriksson et al., 2006). Kollmus and Agyeman (2002) overviewed several key theoretical models of environmentally significant behaviour and concluded that all have some explanatory power in certain situations. Environmentally significant behaviour is, according to the authors, too complex to be explained by a single model or theory. Wilson and Chatterton (2011) also argue that the

²⁰ To subsume all possible explanatory factors under one framework, Stern (2000) proposed a general ABC theory, where A stands for attitudes, B for behaviour, and C for context (attitudes and context in interaction determine behaviour). Stern (2000) furthermore distinguished four types of causal variables potentially explaining behaviours: attitudinal factors (norms, beliefs, values etc.), contextual forces (interpersonal influences, advertising, regulation, and other legal and institutional factors), personal capabilities (knowledge, skills, self-efficacy), and habits and routines (see for example Klöckner & Matthies, 2004).

simultaneous use of multiple models is the result of complexity and diversity of emission reduction behaviours.

Thus, different models may represent or define different problems and ask different questions. A unified or universal approach disregarding situational context, as well as differences in methods, measurement, and definitions of the problem (e.g., defining other public responses to policies than acceptability or support), would unnecessarily limit the scope of the research and its ability to explore new ideas and areas of the field. Therefore, the framework proposed here is not a fixed theoretical model, but rather a map of possible relationships. The importance and strength of these relationships is proposed to be dependent on the context of measurement and, possibly, context of policies. The latter dependency or interlinkage, however, is hard to assess in a general manner, since national, political, or economic contexts of policies are currently rarely assessed or analysed in this field.

The evidence synthesised in the remainder of this chapter was collected from studies examining public responses to climate policies in general and taxes in particular (as described in section 3.1). Occasionally, other relevant studies and their conclusions are cited, where other evidence is lacking or the results are highly informative to the problem at hand. Given the narrative character of the review, the two groups of studies are analysed jointly, but with respect to their aims and the character of the dependent variables. A basic overview of some selected variables and their effects within the models tested in the reviewed studies is presented in Table 9. The overview serves to orientation and summary. Variables requiring more detailed commentary on measurement, setting, and context are omitted.

Table 9: Overview of associations between attitudes to climate policies and taxes and selected variables tested in reviewed studies

Independent variable	Nr. of models/analyses with variable	Sig. (0.1) effect on DV		Not stat. sig.
		+	-	
Socio-demographics:				
Age	41	8	11	22
Gender (female)	56	17	6	33
Ethnicity (minority)	23	4	3	16
Education	45	20	1	24
Income	32	15	1	16
Left political orientation	15	8	1	6
Liberal political orientation	22	17	0	5
Democrat (US only)	14	7	0	7
Membership in env. org.	9	6	0	3
Values:				
Pro-environmental (NEP and other measures)	22	19	0	3
Altruistic	6	5	0	1
Egoistic	6	0	3	3
Climate change:				
is occurring	7	6	0	1
awareness	5	5	0	0
knowledge	5	4	0	1
self-reported informedness	11	6	0	5
concern and risk perception (diverse measures)	17	15	0	2
negative affect	4	4	0	0
Policy:				
effectiveness	22	20	0	2
fairness	8	6	0	2
coerciveness	2	0	2	0
revenues used for environmental protection	4	4	0	0
label: tax	6	1	3	2
Trust in:				
experts	7	5	0	2
media	6	0	0	6
government	20	15	2	3
citizens and general trust	3	2	0	1

4.2. The value basis of policy attitudes

As argued in chapter 3, climate policy attitudes are based in an underlying evaluative tendency. This tendency is assumed to be related to other attitudes, worldviews, and values. Except for concern about climate change and environmental values (see below), however, the evidence on the associations between other value-based concepts not included in the VBN theory model is diverse and scattered across different approaches and models. The social-psychological and value bases of policy attitudes as supported by existing evidence are overviewed and summarized in this section with the Value-Belief-Norm theory as a point of reference.

General value orientations

Within the model of the VBN theory, general value orientations are usually measured distinguishing biospheric, altruistic (or self-transcendence), and egoistic (or self-enhancement) value orientations of individuals. This concept of general values was derived from Schwartz's complex scale of values distinguishing also other possible orientations (Schwartz, 1992, 1994, Schwartz & Bilsky, 1987, 1990). Nonetheless, other measures or related concepts have also been employed as indicators of general value orientations, including measures of fatalism, egalitarianism, individualism, traditionalism (Leiserowitz, 2006; Shwom et al., 2010; Smith & Leiserowitz, 2014), and post-materialist and materialist value orientations (T. Dietz et al., 2007; Inglehart, 1977, 1995).

With the sole exception of the study by Harring and Jagers (2013), who included self-transcendence and self-enhancement in their model of attitudes toward a CO₂ gasoline tax, all studies examine the association between values and the aggregate climate policy response. Harring and Jagers (2013), however, found the same indirect and positive effect of altruistic value orientation and negative effect of egoistic value orientation as reported in studies using aggregate measures (Steg et al., 2011, 2005). Furthermore, Smith and Leiserowitz (2014) report a positive effect of egalitarian values (also reported by Leiserowitz, 2006) and negative effect of individualism on aggregate policy attitude measured on a representative sample of the U.S. public.

On the other hand, the evidence on the influence of self-concern on climate policy attitudes is mixed and the association is probably conditional on other (policy-specific) factors. In a study of WTP for green electricity by Hansla and colleagues (2008) only self-transcendent or altruistic value orientation had an indirect significant effect (mediated by attitudes) compared to self-enhancement orientation which had no effect at all. Schade and Schlag (2000, 2003) presented a combined NAM and TPB model of transport measures in which perceived personal expectations about policy outcomes was the factor with the second most predictive power. On the other hand, in Kallbekken's and Sælen's (2011) study of hypothetical referendum about taxes, the beliefs about consequences of the policy to oneself had only little predictive power compared to beliefs about environmental consequences. This result led the authors to the conclusion that the standard economic model of self-interested behaviour is not well-suited for explaining the voting decisions about fuel taxation. Furthermore, Dietz, Dan, and Shwom (2007) and Shwom, Bidwell, Dan, and Dietz (2010) found no statistically significant association of egoistic values to general climate policy attitude, while Steg and colleagues found a direct negative effect in one study (2011) and indirect negative effect in another (2005).

Shwom and colleagues (2010) compared the explanatory power of values, namely altruism, traditionalism, and political orientation, with explanatory power of reasons respondents provided to explain why they decided to voice positive opinion on climate policy. Values as measured by the authors were in general stronger predictors than reasons provided by the respondents. This led the authors to the conclusion that policy attitudes are based in broader values and beliefs, rather than personal cost-benefit analysis. Interestingly, values had only little explanatory power with respect to the reasons respondents provided for their respective evaluations of policies. Such results support the notion of value-based policy attitudes on one hand and probable absence of careful deliberation by respondents on the other. Moreover, the results support a thesis proposed in research on influence of political ideology and partisanship – when dealing with complex issues such as climate change policy, respondents tend to rely more heavily on broader values and cues (political party among others). Therefore, the reasons they provide may be *post hoc* rationalisations, rather than premeditated arguments in personal deliberation.

To sum up, people with self-transcendent or altruistic values are more likely to have specific value orientations or beliefs associated with more positive climate policy evaluations. This conclusion is quite robust. Such robust evidence is still lacking for other value orientations. Some value orientations may become salient only in certain policy contexts – transportation policies may be subjected to greater influence of self-interest, as changing travel behaviour is usually associated with higher costs (both behavioural and economical), partly due to its habitual character and embeddedness in structures of transportation (see Steg & Garling, 2007 for detailed discussion on travel behaviour).

So far, we know little about interactions of competing value orientations and their translation in policy-specific attitudes. Stoutenborough, Bromley-Trujillo, and Vedlitz (2014) find important differences in factors explaining attitudes toward market incentives compared to other policy measures, such as industry taxes or support for renewable energy. Even environmental values, otherwise an important factor, were not statistically significant in case of market incentives. This example can, of course, be an exception caused by some hidden inference or unobserved factor, but it raises caution.

The policy instrument in question may evoke diverse values and worldviews, even competing with the ones commonly used to explain attitudes toward policies within a single policy domain. Dreyer and Walker (2013) found an interaction between perceived effectiveness of Australian Clean Energy Legislative Package (including taxes) and endorsement of the free-market ideology. Respondents who found the proposed policy effective did not differ in their overall evaluation of the package with respect to their beliefs about free market and state regulation. But among those who did not find the package effective, respondents with higher scores on the free-market ideology scale were less likely to form positive opinions about the package than respondents with lower scores. Although this result is so far solitary and the sample was not representative of the general public, it furthermore draws attention to the possible effects of values which may become relevant depending on other (policy-specific) factors.

A different take on values is provided by cultural theory originally formulated by Douglas and Wildavsky (Douglas, 1970, 1984; Douglas, Gasper, Ney, & Thompson, 1998; Douglas & Wildavsky, 1983). Cultural theory posits that different social groups have different priorities based on their values shared and embedded within communities and accentuated in visions of ideal community or society. Communities also differ in the intensity of their lived and

intended social integration and regulation (group and grid). Four (Weberian) ideal types of social groups are recognized within the framework²¹. Hierarchists with high levels of social regulation and integration prefer regulation and collective actions and solutions and thus contribute to preservation and reproduction of social order. Individualists with low levels of integration and regulation have priorities in unrestricted individual freedom and independence, therefore they are the source of innovation. Fatalists, with high level of regulation and low level of integration, follow the rules but remain individualised with no significant impact on the community, and egalitarians with high level of social integration and low level of regulation do not trust the authorities prescribing the rules and prioritize the rights of all – people, animals, and nature, collectively. These groups furthermore differ in what risks they regard as threatening to the (ideal) community as imagined and constructed by the core priorities and values of the group (e.g., social order for hierarchists and human rights for egalitarians).

The individual risk perceptions, but also the perceptions of nature, are often regarded as 'biased' by the worldview shared and formulated within the group. Hierarchists see nature as vulnerable at some point, but they expect it to settle in a new equilibrium state once disturbed. Fatalists do not have a definite opinion on nature and its vulnerability. Individualists see nature as very resilient, while egalitarians see it as very fragile. Thus, egalitarians are theorized to be the most concerned by environmental risks, whereas other groups prioritize other types of risks and their concern is lower (low for individualists and fatalists, medium for hierarchists).

Poortinga, Steg and Vlek (2002) use the concept of myths of nature (group specific perceptions of nature) to explain attitudes toward risk management strategies. Respondents evaluated two dimensions of risk management strategies: political and solution strategies. The first concerns the responsibility for solutions to environmental problems (ascribed either to government or market), the second focuses on the form of solutions (either behavioural or technical). Results of the study showed that respondents subscribing to the view of nature as benign (individualists) evaluated market-oriented strategies more positively, while they regarded governmental regulation more negatively compared to the other groups. Cultural theory also assumes that egalitarians would not prefer governmental solutions due to their mistrust to experts and official authorities (Rippl, 2002). Surprisingly, egalitarians (subscribing to the ephemeral nature myth) saw governmental regulation as positive most often (and, as expected, the behavioural solution strategies as well), while the other two groups held a middle position. There were no statistically significant differences in attitudes to governmental regulation between individualists, hierarchists, and fatalists. Moreover, egalitarians evaluated market-based instruments as positive the least, while hierarchists and fatalists took the middle positions again. This may reflect even greater mistrust of egalitarians toward market principles and actors.

Leiserowitz (2006) applied cultural theory²² on risk perception in the US. He tested models of several dependent variables, including policy attitudes (a constructed "Policy Preferences

²¹ The names and number of these groups are different in different works. Here the most common four groups are used (see Tansey & O'Riordan, 1999).

²² The approach taken in the studies is methodologically individualistic, although the theory itself is embedded in characteristics of social groups, not individuals. The theory is often applied in empirical research in a methodologically individualistic mode of use as a psychological typology (Tansey & O'Riordan, 1999). Such an application is criticized as a model of risk perception (Douglas, 1992, p. 40; Sjöberg, 2002) and does not overcome

Index"). While positive attitudes toward national policies in general and tax policies specifically correlated with egalitarianism, negative attitudes to both national and tax policies correlated with hierarchism and individualism. Fatalists were more likely to oppose tax policies only. Smith and Leiserowitz (2014) also found a statistically significant positive effect of egalitarian cultural worldview and a significant negative effect of individualism on aggregate climate policy attitude.

Again, the reported differences among individuals with different worldviews and implied ideas about how society should look like are also heavily influenced by the nature of proposed policies and policy instruments. A certain idea of society likely posits ideas about suitable solutions. These ideas may be quite general, but will likely manifest in attitudes toward proposed solutions and in beliefs about the roles and responsibilities of certain social actors. Although further evidence of the importance of general value orientations within this field is scarce, general values form a basis of environmental values and concern (Stern & Dietz, 1994), as well as political orientation and more specific views on the role of the state and other variables. These can in turn be key factors associated with policy attitudes and environmentally significant behaviour, and thus translate the indirect effect of general values.

Environmental values

Environmental value orientation has a direct (Bord et al., 2000; Harring & Jagers, 2013; Lubell et al., 2007; O'Connor et al., 2002; Shwom et al., 2010; Steg et al., 2011; Stoutenborough et al., 2014; Zahran et al., 2006) or mediated (T. Dietz et al., 2007; Joireman & Liu, 2014; Steg et al., 2005) positive effect on policy attitudes in most models where it had been included.²³ The mediation effects are reported to be in line with the assumptions of the VBN theory. In the model of the VBN theory as applied in several studies (T. Dietz et al., 2007; Eriksson et al., 2006, 2008; Harring & Jagers, 2013; Joireman & Liu, 2014; Steg et al., 2005) the effect of environmental values on policy attitudes is theorised to be mediated by awareness of consequences (or climate change concern). Some studies report that both environmental values and concern have an effect when included in one model (Bord et al., 2000; Lubell et al., 2007; Zahran et al., 2006). Harring and Jagers (2013) also concluded that the regression coefficient of the NEP has been statistically significant steadily regardless what additional variables were included to the model. Since studies testing the VBN theory model also confirmed mediation effects through the variables further in the mediation chain (T. Dietz et al., 2007; Joireman & Liu, 2014; Steg et al., 2005), environmental values likely have both direct and indirect effect on policy attitudes.

Only one study reported statistically non-significant effect of environmental values (Stoutenborough et al., 2014). The authors tested the same model for several classes of climate policies and the positive statistically significant effect of environmental values was, next to the positive effect of liberal political orientation, the single most robust effect in all models – except for attitudes toward market incentives. Attitudes toward market incentives may therefore be driven by other kinds of value orientations, for example those about free

the criticism raised by Shove (2010a) towards social psychological models of behaviour omitting broader societal context and structure (limiting individual opportunities and shaping their practices).

²³ Eight studies in total employed some version of the NEP scale (New Environmental/Ecological Paradigm scale created by Dunlap and Catton in line with the core ideas of the Paradigm itself Catton & Dunlap, 1978; used in Bord, O'Connor, & Fisher, 2000; T. Dietz, Dan, & Shwom, 2007; Harring & Jagers, 2013; Lubell, Zahran, & Vedlitz, 2007; Shwom, Bidwell, Dan, & Dietz, 2010; Steg, Dreijerink, & Abrahamse, 2005; Zahran, Brody, Grover, & Vedlitz, 2006). Three studies employed other measures of general pro-environmental attitudes and values.

market or views on economy and the role of the state in it. Sadly, no measures of such views or opinions were included in the tested model, so any comparison is impossible. Still, this singular exception clearly points out that despite the evident existence of common general grounding of policy evaluations, important differences may arise once other principles or value orientations are made salient. On the other hand, this is not a condition that would be easily evoked by framing effects (Bernauer & McGrath, 2016). Despite this (so far) singular exception, both general and specific policy evaluations seem to be steadily anchored in environmental values.

Climate change concern, affect, and risk perception

Concern about climate change and its consequences, awareness of these consequences, and perceived risks of climate change all play an important role in formation of attitudes toward climate change mitigation policies. People tend to find emission reduction policies as more acceptable if they believe that climate change is happening (Bannon, DeBell, Krosnick, Kopp, & Aldhous, 2007; Ding et al., 2011; Joireman & Liu, 2014; Kotchen, Boyle, & Leiserowitz, 2013; Smith & Leiserowitz, 2014), if they are concerned about the possible environmental problems connected to global climate change (or about climate change in general) and if they regard potential impacts as severe or negative²⁴.

Awareness of climate change and its consequences is an influential factor regardless of the specific policy domain and respective specific environmental consequence in question (T. Dietz et al., 2007; Eriksson et al., 2006; Harring & Jagers, 2013; Longo, Hoyos, & Markandya, 2011; Steg et al., 2005). These effects have been reported in diverse models for taxes and climate policies in general. Thus, concern about climate change seems to be a universal or common factor associated with the underlying general attitude toward any political endeavour to tackle climate change.

Anticipated effects on one's own health or welfare, or perceived personal risk, however, have been measured less often and their effects are less robust. Kim and colleagues (2013), for example, report an indirect mediated positive effect of perceived personal consequences of global warming on policy attitudes. Hersch and Viscusi (2006) report a positive direct effect of perceived consequences to health. This effect was not dependent on positive effect of climate change concern. On the other hand, Bord, O'Connor, and Fischer (2000) and Lee and Cameron (2008) find the effect of perceived personal consequences not statistically significant. The overall robust positive association of policy responses with perceived general consequences was, however, statistically significant in these models.

Climate change is often perceived as a distant threat (Liu, Xie, & She, 2014; Lorenzoni & Pidgeon, 2006; Lujala, Lein, & Rød, 2015 for Norway; Scannell & Gifford, 2013). In fact, the role of psychological distance in climate change perception and policy attitudes is far from thoroughly explored and understood (McDonald, Chai, & Newell, 2015). Climate change may indeed be perceived as distant on multiple levels – spatially, temporally, socially, and as hypothetical or abstract (more on the concept of psychological distance e.g., Newell, McDonald, Brewer, & Hayes, 2014; Pahl, Sheppard, Boomsma, & Groves, 2014; Scannell & Gifford, 2013; Spence, Poortinga, & Pidgeon, 2012), but that does not necessarily mean it

²⁴ (Bord et al., 2000; Cai, Cameron, & Gerdes, 2010, 2011; Carattini & Baranzini, 2014; Ding, Maibach, Zhao, Roser-Renouf, & Leiserowitz, 2011; Hammar & Jagers, 2006; Hersch & Viscusi, 2006; Ivanova, 2011; Kachi et al., 2015; Kallbekken & Sælen, 2011; Kaplowitz & McCright, 2015; J. Kim, Schmöcker, Fujii, & Noland, 2013; Lee & Cameron, 2008; Lubell et al., 2007; O'Connor, Bord, Yarnal, & Wiefek, 2002; Stoutenborough, Vedlitz, & Liu, 2015; Viscusi & Zeckhauser, 2006; Zahran et al., 2006)

elicits a weaker emotional or behavioural response. It actually seems to be the opposite – people are generally more optimistic regarding the risks climate change may pose to them personally (Pahl et al., 2014), but tend to perceive the global or temporally distant threats as more serious (Spence & Pidgeon, 2010). Consequently, some studies suggest that willingness to act on climate change is higher if the impacts are perceived as severe and distant (see McDonald et al., 2015 for review). Study 2, presented in section 4.5 in this chapter, also confirms that distant impacts are relevant and can increase positive attitudes toward public spending on climate change policies.

Brügger and colleagues (2015) even point to possible adverse effects of proximising climate change, namely negative emotional reaction leading to detachment or denial. Risk perception and climate change concern can undoubtedly evoke negative emotions, such as fear, anxiety, anger, feelings of helplessness, and others. The question is, whether these emotional responses relate to evaluations of climate policies.

Smith and Leiserowitz (2014) measured the holistic affect by respondents' ratings of global warming as good or bad, while Leiserowitz (2006) asked respondents whether respondents have any negative feelings about global warming and how strong these negative feelings were. Both variables had statistically significant effects on aggregate policy attitude. Similarly, Hart (2011) measured emotional response to a story of climate change impacts on polar bears and their environment. Those who felt more anxious or worried after reading the story were also more likely to have more positive aggregate attitude (although the emotional response was measured by agreement with statement "After reading the story I felt worried/anxious", which is rather a suggestive question likely to bias the results and there is no telling for how long would such an emotional response influence individual attitudes and behaviours).

Smith and Leiserowitz (2014) explored the issue in more detail. Respondents were asked to provide first words that come to mind when thinking about global warming and subsequently to specify what affect they attribute to that idea (is it a good or a bad thing?). Respondents also rated the intensity of their emotions, namely fear, helplessness, interest, anger, sadness, hope, depression, guilt, disgust, and worry. The authors concluded that discrete emotions alone could explain a considerable amount of variance of the aggregate policy attitude. Worry was the single strongest predictor as compared to fear whose effect was not statistically significant. Positive emotions too were important explanatory factors. These results contrast with some existing information campaigns inducing fear of climate change consequences to motivate people to act (see Figure 5 as an example). Leiserowitz and Smith (2014) argue that emotions have stronger explanatory power than holistic affect or cultural worldviews (egalitarian values and individualism), but the authors did not include environmental values or other measures of climate change concern, nor did they explore what is the relationship between discrete emotions invoked by climate change and climate change concern. These two concepts are likely to be related and overlapping.

Figure 5: World Health Organization "Climate Change Hurts" poster



WHO Climate Change Hurts add

Accessible at: <http://www.who.int/globalchange/mediacentre/posters/en/>

In sum, concern over impacts of climate change and related risk perceptions and emotions are likely to be a part of the common value basis of policy attitudes. Again, one can expect that the influence of concern accompanied by evoked affect and emotions would vary with context and depend to a degree on whether awareness of consequences has been raised during the elicitation of policy attitudes. In general, however, the relationship seems to be quite robust and very important, as proposed within the VBN theory model. Yet, the role of different emotions and the nature of their origin or emotional triggers remains underexplored and so far, uncomprehended.

Political orientation and partisanship

Political ideologies and orientations are sets of values, attitudes, and beliefs (Eagly & Chaiken, 1993) and attitudes toward policies will likely vary with political orientation of the respondent. A positive association of attitudes toward climate change mitigation policies with left and liberal political orientation, as well as backing green parties, is supported by robust evidence, although rare exceptions are present. 8 models out of 11 testing the effect of left-right political orientation (see Table 9) concluded that those who indicate to be left-wing oriented are more likely to respond more positively to climate change policies. Similarly, 14 out of 17 models testing the effect of liberal political orientation bring evidence of statistically significant positive effect, although it may be mediated through other value-based variables.

Although Democrats seem more likely than Republicans to form positive attitudes toward climate actions in the US (Bannon et al., 2007 on samples representative of adult population; McCright et al., 2013; O'Connor et al., 2002 on sample of residents of Pennsylvania; Wiest, Raymond, & Clawson, 2015), the effect is not universal. Respondents' opinions on the role of the state in market regulation derived from general ideological views can enter their evaluations of (specific) climate change policies (see for example Study 1 in this dissertation,

where preference for state regulation had a statistically significant effect on composite measure of attitude toward environmental policy) and compete with their otherwise pro-environmental values. Stoutenborough, Bromley-Trujillo, and Vedlitz (2015), for example, found statistically significant positive effect of sympathising with Democrats on attitudes toward policies increasing prices of fossil fuels only. The positive effect of identification with the Democratic Party was accompanied by a negative effect of identification with the Republicans. Such negative effect was present also for industrial taxes and the aggregated measure of all policy options, although it was not accompanied by the opposite positive effect of self-identification as a Democrat. For other analysed policies, namely market incentives, support for renewable energy, and increased fuel efficiency, no statistically significant effects of identification with either party were reported in the study. Effects of political orientation are therefore hardly straightforward.

Information about the instrument and instrument characteristics can be evaluated through ideological lenses and interpreted within specific political discourses relevant to respondents' political orientations. Hart and Nisbet (2011) argue that citizens process and interpret information in a way that reinforces their existing opinions and beliefs. The proposition Hart and Nisbet (2011) reference is *motivated reasoning* and they argue that respondents, in order to efficiently process all information needed to form an attitude, use heuristics and shortcuts, such as political orientation and social identification among others. Similarly, Rugeley and Gerlach (2012, p. 444) argue that with increasing complexity of environmental issues, climate change being one of the most complex, citizens tend to rely on "familiar shortcuts", such as political orientation and party identification.

The evidence regarding the use of policy specific information and party cues (who proposes and backs the policy proposal) in formation of policy attitudes in general (not only environmental or climate change related) is mixed and it is not yet clear whether information about policy or party cues play a decisive role. Ciuk and Yost (2016) provide, and further empirically support, a consolidation of the diverging results – citizens rely on both policy information and party cues when deciding about salient issues. When less salient issues are in question, respondents rely more heavily on party cues. Yet their study supporting these propositions involved only a small and not representative sample. Similar proposition can be made with respect to issue complexity – if political ideology plays greater role for more complex issues (Rugeley & Gerlach, 2012), the same can likely be true for party cues.

Carrico and colleagues (2015) concluded that political orientation on the liberal-conservative scale is far more important in the formation of policy attitudes than provision of additional information or policy framing. Hardisty, Johnson, and Weber (2009, p. 6), for example, report labelling effect conditional on party identification. While Democrats were not sensitive to whether the policy was labelled tax or offset, Republicans were sensitive to the label "tax" (not "offset"), which led the authors to conclude that "the power of a framing manipulation can depend on participants' pre-existing differences".

The effects of framing and labelling of policy instruments, however, should not be overstated. Some authors suggest and empirically support a conclusion that the simple choice of words such as "prices" and "subsidies" would hardly make any difference at all (Villar & Krosnick, 2011). Indeed, some frames are likely to amplify political polarisation of attitudes (Hart & Nisbet, 2011) and therefore some may be able to subdue it (Severson & Coleman, 2015), but it appears that once a political divide exists, it will not be easily overcome by policy framing and labels. For example, framing climate change with respect to values mostly held

by conservatives fails to increase levels of positive evaluation of climate change mitigation strategies (Severson & Coleman, 2015).

Moreover, individual opinions are susceptible to even stronger polarisation once political identity of the citizens is made salient. Unsworth and Fielding (2014) report this effect in a survey setting – once respondents' left political orientation was made salient in the survey, they reported higher levels of positive attitudes toward carbon pricing than when answering without bringing political orientation to their attention. The reverse was true for those oriented to the right – respondents in the experimental condition reported less positive attitudes compared to those whose right political orientation was not made salient. The saliency of respective political orientation widened the divide already present in respondents' answers.

Hart and Nisbet (2011) also report polarisation between Republicans and Democrats and its slight amplification through polarized identification with potential climate change victims. The victims were presented in the framing experiment as in high or low social distance from the respondent (either in upstate New York, where the experiment was run, the state of Georgia, or France). There were no statistically significant main effects of the framing conditions, but conditionally on political orientation Democrats were more likely to assess proposed policies positively if presented with any information on victims. Message about more distant victims resulted in slightly lower share of Republicans stating positive attitude toward emission reduction policies.

Similar effects are reported in this dissertation in Study 2, where different spatial and temporal framings of public spending on reduction of climate change and air pollution risks had only minimal main effects, but considerable effects conditional on left-right political orientation of the respondents (with those on the left less susceptible to framing and those on the right preferring homeland risk reduction). Furthermore, Rickard, Yang, and Schuldt (2016) concluded that different departure dates of policies hardly exerted any main effects on climate related perception in experimental setting, but there were some interactions with political orientation. Greater effects were reported for conservatives (liberals having more stable attitudes in this case). Lu and Schuldt (2015, 2016) also report the link between emotions and policy attitudes is conditional on political orientation, among other variables. These results are in line with Rugeley's and Gerlach's (2012) conclusion and support the thesis of motivated reasoning presented by Hart and Nisbet (2011).

In a study by Smith and Leiserowitz (2014), the effect of liberal political orientation is mediated through other value-based variables added to the model. Similarly, McCright, Dunlap, and Xiao (2013) and Dietz, Dan, and Shwom (2007) report mediated effects of liberal political orientation through worldviews, environmental beliefs, beliefs about global warming, and perceived scientific agreement. Joireman and Liu (2014) concluded that liberal political ideology mediates the effect of gender on environmental values, beliefs about global warming, and consequently policy evaluations.

Turning the discussion on its head, the solution aversion model proposes that climate change views are affected by attitudes toward most popularly discussed solutions to climate change rather than the other way around (T. H. Campbell & Kay, 2014; Ziegler, 2017). In consequence, scepticism toward climate change may be at least partly driven by aversion towards specific policies which represent the solutions as perceived by respondents. The results reported so far can support such explanation, although given the nature of cross-sectional surveys, any conclusions about the direction of causality are unwarranted.

Moreover, the positive effects of left-wing and liberal orientation do not have to be universal for all countries. Most of the reviewed studies focuses on western European and North American democracies. The only study including eastern European countries, specifically post-communist ones (McCright, Dunlap, et al., 2016), found a negative effect of left-wing orientation in aggregated data for willingness to make economic sacrifices for climate policy and no statistically significant effect for evaluation of the EU emission reduction targets (whether they are too modest, about right, or too ambitious). Similarly, Study 1 presented earlier in this dissertation (Kyselá, 2015) found no statistically significant effect of left political orientation on passive acceptability response to energy policies in the Czech Republic and only negligible statistically significant positive effect on willingness to make economic sacrifices.

These results do not necessarily suggest left political orientation has different implications in the post-communist countries. Rather, left political orientation can have diverse meanings by itself and be related to distinct value orientations (Piurko, Schwartz, & Davidov, 2011). More cross-national studies comparing countries with different historical development and democratic or partisan traditions and practices are needed in order to reach conclusions about political orientations and their associations with policy attitudes. Special attention should be paid to issues of equivalency (Anýžová, 2013; Mayerl, 2016) of both political orientation and policy attitudes (see above). So far, it is safe to conclude that at least in western European and North American democracies, it is likely for left or liberal oriented citizens to respond more positively to climate change mitigation policy proposals.

Given the importance of political orientation and the diversity of its effects, future research should employ more sensitive multidimensional measures which may help to find and explain important differences between citizens based on their views (Ziegler, 2017). As overviewed above, different political orientations and ideologies may relate to different frames, attitudes, and perceived policy characteristics – and not only those necessarily opposing each other, but also complementary ones. For example, individuals on the liberal side of the spectrum may differ with respect to their left or right orientation, green orientation, and so on. No one's political orientation is unidimensional and such multidimensionality contributes to multitude of effects and seemingly contradictory or at least counterintuitive effects. Such counterintuitiveness may, however, be just a result of a too simplistic research approach.

Social and personal norms

In terms of norms, the VBN theory incorporates an earlier Norm Activation Model (NAM) by Schwartz (1977). The model was originally formulated to explain prosocial behaviour and posits that individuals perform such behaviour in response to feelings of moral obligation to do so, i.e., in response to personal norm. This norm is activated if an individual is aware of the consequences of not acting, feels responsible and able to act, and can identify the actions leading to the desired results (Steg & de Groot, 2010). Within the model of the VBN theory, personal norm also mediates the effect of general and pro-environmental values, although the model usually does not include personal and outcome efficacy (feeling able to act and identification of suitable actions to be taken).

Personal norm reflects the moral and value bases of policy attitudes. Moreover, it seems that personal norm as a feeling gives rise to both actual and expected emotions. Anticipated emotions such as guilt and pride can then mediate the effect of personal norm on the behaviour or behavioural intention (Onwezen, Antonides, & Bartels, 2013). Personal norm is

therefore tying together complex conscious and not reflected past, present, and predicted considerations, as well as emotions.

Individuals also consider values, beliefs, and feelings of other people, which constitute social norms. While personal norm is an internalised sense of obligation or duty to act often related to positive or negative emotions providing personal incentives, social norms are obligations enforced by positive or negative expectations and sanctions executed by other actors in society (see Vandenberg, 2005 for the distinction). Informal social norms include descriptive norms depicting what others do, and injunctive norms, prescribing what should be done (Kinzig et al., 2013).

Social norms, although not specifically included in the VBN theory, are a key construct within another prominent theory of behaviour – Theory of Planned Behaviour. Normative beliefs and resulting subjective norm are usually measured in respect to what important others think the individual should do and how they would respond to that individual's behaviour, i.e., the perceived social pressure. Together with perceived behavioural control (barriers and incentives), and behavioural attitudes (including beliefs about the behaviour and its outcomes), subjective norm leads to behavioural intentions and then translates into the behaviour itself.

Given their assumed and reported effect on environmentally significant behaviour, changing or managing social norms has become a popular strategy for attempts to change environmentally significant behaviours (Cialdini, 2003; Kinzig et al., 2013; Vlek, 2000). Mixed effects of such strategies and possibilities of backfiring have been, however, reported (Cialdini, 2003; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). Some authors, on the other hand, suggest to target personal norms, rather than social norms, especially in loose-knit groups and communities where social enforcement and sanctions are hard to come by (Vandenberg, 2005). In the case of policy attitudes, their association to personal norm has been supported by solid evidence, as well as its mediating role in the NAM and VBN models (T. Dietz et al., 2007; Eriksson et al., 2006; Harring & Jagers, 2013; Steg et al., 2005). Social norms, on the other hand, are examined only rarely.

Although the evidence in the field of attitudes toward climate policies is so far lacking, judging from the robust evidence in the broader field of environmentally significant behaviours, social norms related to targeted behaviours can exert a significant effect on policy attitudes. Especially in cases where a policy targets a specific behaviour, citizens' beliefs that people already behave in the desired way or that they cannot be persuaded to do so, as well as their beliefs that they are or are not expected to behave as suggested, will likely form their attitudes toward the proposed policy.

Social norms regarding the targeted behaviours relate to normative beliefs about how people should or should not behave and whether their behaviour should be regulated by the state. Obviously, diverse values and other normative considerations can compete – a woman may be convinced she, as well as other people in her neighbourhood, should recycle household waste, but most people are lazy to do so. She also thinks individual choice and freedom should be respected at all times and therefore she would not agree with sanctions and regulation of individual waste management. On the other hand, she would probably agree with providing positive incentives to people who recycle and with information and normative campaigns. Another woman would also believe that people in general do not recycle (descriptive social norm), but compared to the first woman, this one would also believe that recycling is not generally approved within her reference group, that only posh people do it for

example. Such a woman would probably not see the need for any policy in this regard, although her own pro-environmental values may result in high support for recycling policies despite her normative beliefs. Countless other situations may be exemplified or encountered – the interactions of norms and values regarding the targeted behaviour are various and complex.

To complicate things even more, there are also social norms regarding the evaluation of a policy itself. Again, citizens can have normative beliefs about what attitudes regarding the policy (or climate change policy in general) pervade in society and that supporting climate policies, or at least having positive attitudes towards them, is something socially desirable. De Groot and Schuitema (2012) reported higher policy acceptability as an effect of a strong social descriptive norm indicating support for the policy by most people compared to a weak social norm (i.e., that only a minority of public supported the policy). While subsidies were acceptable for more people than taxes disregarding what norm was provided, acceptability of taxes was higher in the strong social norm experimental condition than the weak one. Hence, although the effect of descriptive social norms clearly cannot overcome stronger principles, values, or beliefs, it can shift the aggregated evaluation of some policies.

It is important to consider the possible effect of descriptive norms in models of policy-specific attitudes in interaction with other variables for two reasons. First, providing information on descriptive norms can be a quick and cheap strategy to increase levels of policy acceptance, if acceptability proves to be responsive to these norms. And second, general attitudes toward environmental and climate policies are in overall positive. Although the shares of citizens expressing positive attitudes tend to decrease with inclusion of costs or with other considerations, the prevalent social norm allows for positive expectations and can be used to enhance the positive evaluation of climate change policies.

4.3. Policy specific variables

An attitude toward governmental climate action in general is likely the prime source of consistency in respondents' answers to survey items measuring attitudes toward specific climate change mitigation policy instruments (see section 3.1). On the other hand, previously summarized results indicate policy-specific variation not only in responses, but also in predictors and associations of attitudes. Diverse values and worldviews may become salient in response to various policy formulations. What policy-specific characteristics may account for these variations and different considerations and how do they relate to the more general value basis of policy attitudes?

In general, policies have many diverse traits, from the key ones, such as what policy instrument or core principle is applied, to details such as the official name or specific projects funded by policy revenues. While policy experts often have a clear idea about the importance of different policy characteristics, with effectiveness in given criteria being on the top, citizens do not have to evaluate policy proposals the same way experts do. The seeming details, such as provision of information about the policy, may have a substantial impact on policy attitudes and perceptions of other characteristics of the policy at hand.

The following section reviews literature on associations between policy attitudes and perceptions of key characteristics of climate change mitigation policy in general and taxes in particular. Moreover, factors explaining the perception of these characteristics and factors related to them are discussed.

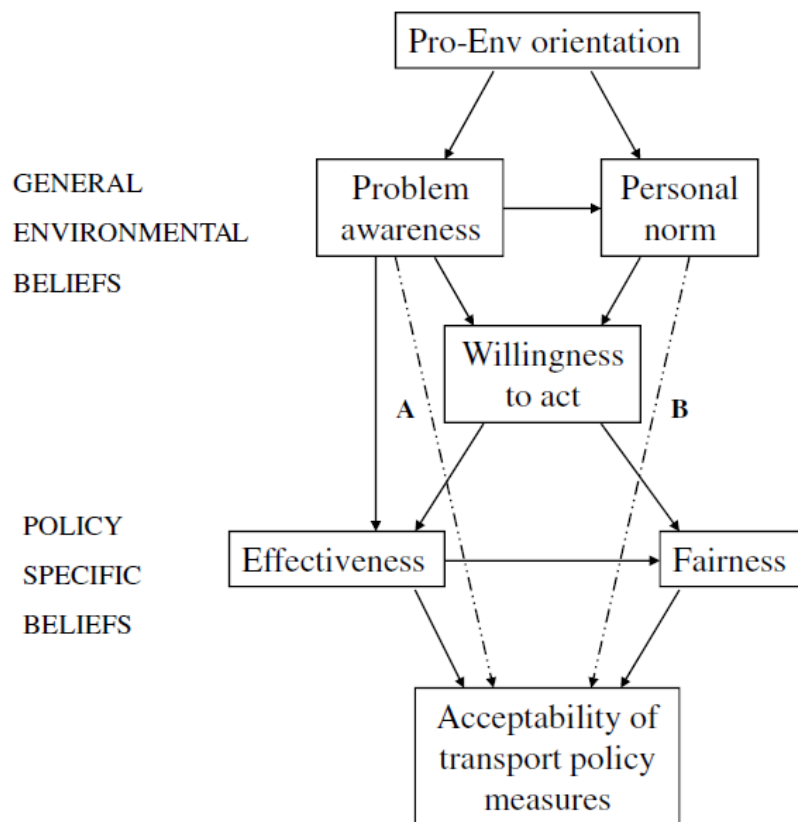
The purpose of the following review is to inform the formulation of the explanatory framework presented in chapter 5. Specifically, the goal is to find a place of policy specific beliefs in the proposed framework stemming from the VBN theory model and informed by the preceding section. The following section therefore overviews the results on policy characteristics and considers mostly studies of taxation as an instrument of climate change policy. Within this domain, different characteristics and considerations are overviewed as explanatory factors of specific policy attitudes.

The results from studies on taxation should not be generalised to other policies without robust evidence of similar results in other domains. Nevertheless, the proposed framework is formulated as flexible and should accommodate for diverse considerations of other policies and instruments. Moreover, some common factors, such as trust in government or politicians, are also discussed due to their relevance for specific policy characteristics.

Perceived effectiveness and fairness, as well as costs, revenue use, and even labels have been identified as having important roles in formation of both general and policy-specific attitudes. There are other attributes apart from effectiveness, fairness, costs, and their distribution. Such attributes are often instrument-specific, for example forestry practices (Layton & Levine, 2003), permit life, permit purchase limits, and other characteristics of ETS instruments (Bristow, Wardman, Zanni, & Chintakayala, 2010). Bristow and colleagues (2010) conclude their exploration of many different characteristics of the ETS and their influence on respondents' choices by emphasising the importance of policy design. Their results, although specific for the ETS, suggest that also more particular features, less important for the overall design of the instrument, matter. Such features, however, are not usually studied. Moreover, only few studies have considered how some perceived policy characteristics affect policy attitudes and how they fit into the existing or proposed models of policy attitudes with other social-psychological or contextual factors.

According to the model proposed by Eriksson, Garvill, and Nordlund (2006, 2008) policy specific beliefs, such as perceived effectiveness and fairness, mediate the effect of more general concepts (environmental values, problem awareness, personal norm, and willingness to act) on policy-specific response (acceptability in this case; see Figure 6). By including willingness to act into the model, the authors neatly resolved the inconsistency between the VBN theory model of behaviour and the aim to explain attitudes rather than behaviour. The first part of their model (up to the concept of willingness to act) is a simplified version of the VBN theory model explaining willingness to act as a behavioural intention, which is then an explanatory factor of policy-specific beliefs and indirectly of policy-specific attitude.

Figure 6: Model of factors predicting acceptability of transport policy measures (the original model, model A, and model B) proposed by Eriksson, Garvill, and Nordlund (2008)



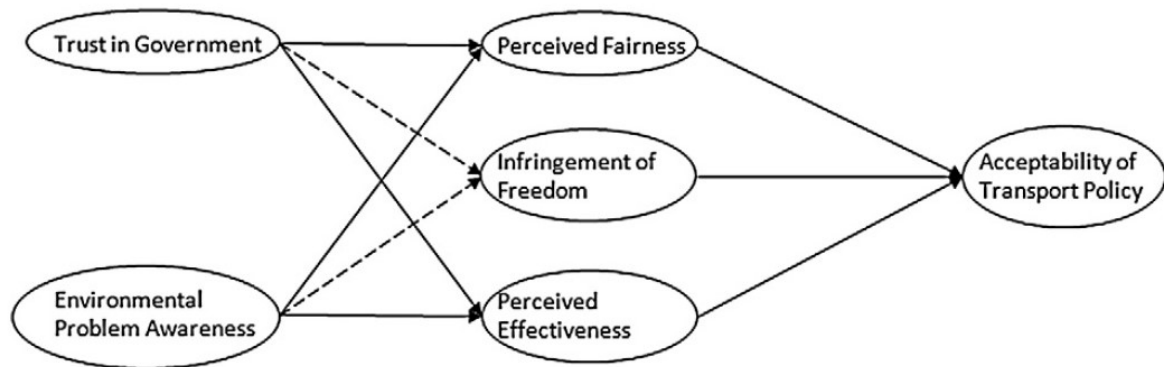
Eriksson, Garvill, and Nordlund (2008) tested three versions of the model (Figure 6): the basic model, model A with added direct relationship between acceptability and problem awareness, and model B with added direct relationships between problem awareness, personal norm, and acceptability. They applied the models on attitudes toward three different policy measures (fossil fuel tax increase, improved public transport, and subsidies for renewable fuels) and two policy packages combining fossil fuel tax increase with either subsidies for renewable fuel, or improved public transport. The path analysis and assessment of the models supported the superiority of the enhanced models A and B. The models explained between 58% and 70% of the variance of the dependent variables.

Cools and colleagues (2011) depart from Eriksson's and colleagues' model (2008) with the aim to explain acceptability of travel demand measures (not necessarily taxes). Their estimated model is also supported by empirical data and includes direct relationships

between problem awareness and perceived effectiveness, and problem awareness and personal norm. Personal norm in turn directly affects policy attitudes and willingness to act, but not perception of any characteristic of the policy. Willingness to act exerts no further effect on any of the constructs included in the model (same constructs as in Figure 6), hence its role is not the mediating one as in the model by Eriksson, Garvill, and Nordlund (2008). Because willingness to act is a construct close to policy attitudes, its role as a mediator of personal norm and problem awareness on policy specific beliefs is somewhat questionable. Environmental values and concern are more likely common factors explaining both perceived effectiveness and willingness to act. Except the effect of perceived effectiveness on perceived fairness, no other factor explaining variance in perceived fairness is proposed.

Kim and colleagues (2013) also incorporate policy specific beliefs into their model (Figure 7). Apart from perceived fairness and effectiveness, the model also contains infringement on freedom, reflecting perceived coerciveness of the measure. In this model, policy specific beliefs mediate the effects of problem awareness and trust in government. The authors tested the model on samples of engineering students from the UK and the US for road pricing and environmental tax. They reported differences between the two policies and two samples, with various policy-specific beliefs having stronger relationships with either taxes, or pricing in the two samples. Infringement on freedom was related more strongly to attitudes toward road pricing rather than environmental taxes and particularly in the UK, where Londoners have an experience with such policy. The mediation effects were also confirmed, although trust in government had also a direct statistically significant effect on policy attitudes.

Figure 7: Hypothetical modelling framework proposed by Kim, Schmöcker, Fujii, and Noland (2013)
Note: Ellipses are latent variables; thick left-to-right arrows denote significant positive paths and dotted arrows negative paths.



These models are the first attempts to formulate a theoretical framework for policy specific beliefs and their effect on attitudes to climate or environmental policies. The three models and some *ad hoc* models in other studies (e.g., Carattini & Baranzini, 2014; Dreyer & Walker, 2013) assume policy attitudes to be directly affected by policy specific beliefs. On the other hand, the models differ in terms of what explains variation in policy specific beliefs, i.e., what precedes them in the model. Factors explaining variation in policy specific beliefs are examined only rarely (usually in more complex models such as those overviewed above).

Perceived effectiveness

Effectiveness in respect to climate change mitigation is naturally a key characteristic of climate change mitigation policies. In these terms, effectiveness is predicted by expert models of climate and economy and experts usually agree, in broad terms, what policy instruments

are more likely effective than others. Although the direct and indirect effects on emission reduction (hopefully resulting in prevention of an increase of temperature) are the prime concern when proposing and implementing policies, various policy instruments have various effects in other domains, most of which can concern citizens and their day to day routines. First, the behavioural effects of many policies, i.e., providing incentives to change one's habits and behaviours, are an obvious key factor of effectiveness. Second, various side-effects or additional benefits (or costs) can be expected, for example effects of fuel taxes on transport density and infrastructure, increase in local air quality as a consequence of emission reduction, normative changes in what people think is right to do, and impacts in related sectors of economy²⁵.

In these and other regards, policy effectiveness can affect the evaluation of specific policies. In what follows, different measures of policy effectiveness as used in the existing research and related results are overviewed with the aim to establish what role(s) does the subjective evaluation of policy effectiveness play in formation of policy attitudes.

Probably the most straightforward way to measure the effectiveness of a mitigation strategy is to calculate the temperature increase the policy would prevent or an annual percentage reduction in GHG emissions. However, this may be too abstract for respondents to imagine. For example, many people do not know what consequences are associated with an increase of 2 °C. Similar way is to state the improvement in environmental quality (e.g., air quality - S. Dietz & Atkinson, 2010). In both cases, respondents have their own ideas of current environmental quality and its possible deterioration. Perceived effectiveness can therefore be affected by respondents' perception of climate change risk and their problem awareness.

Thus, perceived policy effectiveness likely reflects also other individual beliefs. Jaensirisak, Wardman, and May (2005) used a sequence of binary choice questions to elicit preferences for road pricing policies. They also focused on environmental improvement and tested a hypothesis that those who perceived pollution as a serious problem would have higher values of the environmental improvement variable. Yet the coefficient was insignificant. This led the authors to conclude that the interpretation of 'substantial improvement' may vary across individuals, which supports the idea that individual beliefs play an important role in assessing policy effectiveness.

Some authors use a specific example of climate change impact, such as forest loss in a certain national park in the US (Layton & Levine, 2003) to limit the respondents' imagination and focus them on a specific problem. But such approach also limits the generalisation of results. Another interesting way is to explore respondents' own ideas of possible climate change impacts on nature, them, and their family or neighbourhood, or different sectors of economy etc. and then use these ideas in the experiment for the mitigation effectiveness attribute or measure (Cameron & Gerdes, 2007; Lee & Cameron, 2008), e.g., with two or three levels (no, full and/or partial prevention of respondents' anticipated impacts).

These measures are not common and the easiest way to assess mitigation effectiveness and the most prevalent one as well is asking respondents how likely they believe the policy is to mitigate, reduce, or tackle climate change or reduce emissions with no specification of the amount of such reductions or any quantification or indicators of the effect.

In almost all reviewed studies using such measures, perceived effectiveness had a statistically significant positive effect on attitudes toward taxes (Brännlund & Persson, 2012;

²⁵ Longo, Markandya and Petrucci (2008) for example designed two attributes specific for energy policy: length of shortages of power supply and number of employed in the energy sector.

Dreyer & Walker, 2013; Kallbekken & Sælen, 2011; J. Kim et al., 2013; Tobler et al., 2012). Perceived effectiveness of reducing air pollution also had a statistically significant positive association with attitudes toward fuel taxes. The study by Rosentrater and colleagues (2013) is a solitary exception with mixed evidence – aggregated perceived effectiveness of regulation policies (including taxes on fossil fuels) had a direct statistically significant positive effect on positive attitude toward engineering approaches (such as putting more dust in the atmosphere, largely replacing fossil fuels with nuclear energy, and others). But aggregated effectiveness of other policy approaches, namely engineering approaches and indirect solutions (funding research, increasing energy efficiency etc.) had no statistically significant effect on attitudes toward other classes of policies. This could be indicative of two things – that perceived effectiveness is not always an important factor or that the survey measures used to assess it are not in line with the principles of compatibility²⁶.

The results concerning secondary policy effects are scarce, but in overall suggest that people account for other effects of the proposed policy too. Brännlund and Persson (2012) and Cole and Brännlund (2009), for example, included attributes for effects of unspecified climate change policy on the development of environmentally friendly technologies and on awareness of climate change among the Swedish population. A positive effect of the proposed policy on development of environmentally friendly technologies had a perceived benefit for respondents leading to more positive policy evaluations.

Similarly, the key purpose of environmental taxes is to provide incentives for changing individual and corporate behaviours. Effectiveness in this respect was an important explanatory factor in Hammar's and Jager's (2006) study of attitude toward gasoline taxes among Swedish citizens. Those respondents who believed gasoline taxes to be effective in changing people's behaviour were more likely to form positive attitudes toward it. Similarly, an expected positive effect on behaviour of other people increased the likelihood of respondents having positive attitudes towards taxation of fuel in Norway (Kallbekken & Sælen, 2011). On the other hand, Eriksson, Garvill, and Nordlund (2006) report no statistically significant effect of expectation that others will reduce car use on attitudes toward transportation pricing measures, including taxation.

The question whether other effects may be more important for voters than environmental effectiveness remains to be answered. Moreover, due to the variety of definitions and measurement of policy effectiveness, it is hard to reach any conclusion on what policy results in terms of the timing, geographical or social target (e.g., air quality in cities, better public transport etc.), and extent are important and what is the relationship between perceived policy effectiveness and one's own self-efficacy or effort (not only financial, but also behavioural) to improve this effectiveness. Exploring the reasons for what citizens see as effective and why is another important task for future research.

Moreover, perceptions of policy effectiveness in climate change mitigation are linked to other policy-specific factors, such as revenue use and fairness. Earmarking and higher levels

²⁶ Aggregation across diverse policy instruments can obscure important variations and bias the results. It seems to be almost non-sensical to measure policy-specific evaluations with aggregated variables contradicting the specificity of policy characteristics. Moreover, as proposed by Icek Ajzen for the TPB model, dependent variable and its predictors should be on the same level of generality or specificity (Ajzen, 1988, 2011; Conner & Sparks, 2005). Otherwise the model will underperform. In TPB, this concerns behaviours and behavioural beliefs (not general value orientations). In models of policy attitudes and evaluations, formulation of policies evaluated in the dependent variable and their characteristics explaining the variation should correspond.

of perceived policy fairness may increase perceived policy effectiveness (see below). As discussed above, awareness of consequences of climate change and associated risk perceptions are also related to perceptions of potential effects of proposed policies. Government's ability to implement a policy effectively could also change respondents' evaluations. Perception of effectiveness is furthermore an issue of trust. Bicket and Vanner (2016, p. 366) argue that "[t]he relationship between trust and public acceptability has at least two components: one is confidence in an institution's choice of policy design and capability to implement it effectively".

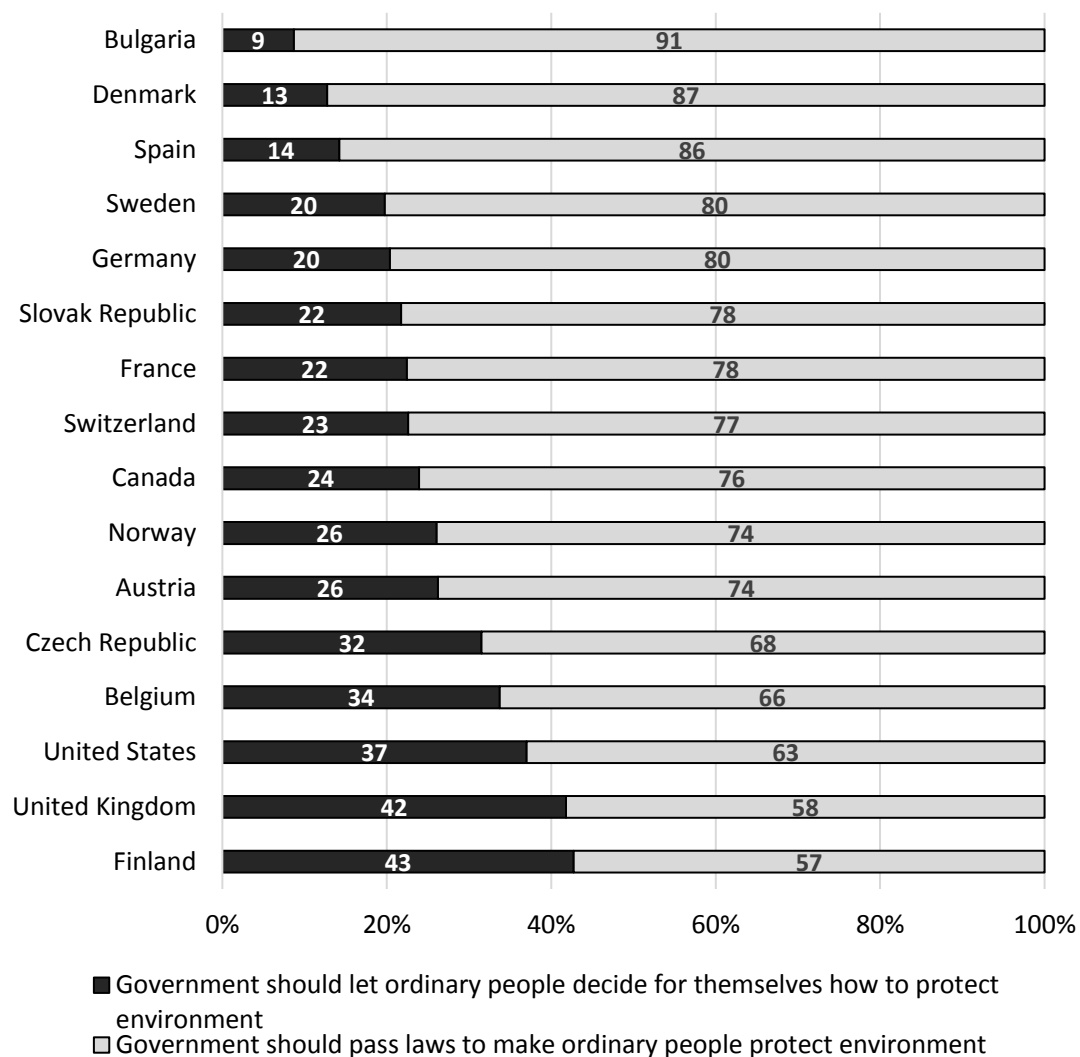
Therefore, one cannot assume a straightforward and simplistic relationship between perceived effectiveness and policy attitudes. Rather, links to climate change concern, trust towards the government, and other characteristics of the policy are likely to be present in formation of policy attitudes. Moreover, researchers should always consider how to formulate the terms and indicators of effectiveness, what policy effects to consider, and which effects may be particularly important for citizens.

Coerciveness and cost

People are quite sensitive to what behaviours are targeted by the policy or what behaviours may be affected by it. If the policy is perceived as limiting behavioural options, its positive evaluation tends to be lower. Jakobsson, Fujii, and Gärling (2000; replicated in Fujii, Gärling, Jakobsson, & Jou, 2004) have found a statistically significant negative effect of perceived coerciveness of transportation measures (not taxes) on attitudes towards these measures. Eriksson, Garvill, and Nordlund (2006), who investigated fuel taxation, public transportation improvement, and information campaigns state that the effect of perceived freedom to choose travel mode is mediated through perceived fairness. Freedom to choose travel mode did not influence acceptability of fuel tax increase directly, but did influence the perceived fairness which was in turn the main factor influencing acceptability. Kim and colleagues (2013) proposed a model presented earlier in this section with a measure of perceived infringement on freedom. The variable had a statistically significant effect on attitudes toward environmental taxes in samples of students from the UK and the US, but the statistical effect was much lower than for road pricing.

In general, citizens have more positive attitudes towards pull measures, i.e., positive incentives rewarding pro-environmental behaviour (carrots), over push measures, i.e., negative sanctions for environmentally harmful behaviour (sticks) (Eriksson et al., 2008; Gatersleben, 2001; Schuitema, Steg, & Kruining, 2011; Steg et al., 2006). De Groot and Schuitema (2012) specify that respondents were more likely to form positive attitudes toward measures that aim at low-cost behaviour (e.g., reducing littering) rather than high-cost behaviour (e.g., reducing car use). The principle is generally the same. Citizens have more positive attitudes toward policy measures that do not require them to change their lifestyles or day to day routines, or the changes are suggested rather than required and thus are subjected to individual decision. On the other hand, according to Stadelmann-Steffen (2011), Swiss voters are more likely to accept measures based on bans and rules, rather than incentives or market-based instruments. This is actually in accordance with an overall preference for governmental regulation of environmental protection. Such preference is prevalent in most western countries (see Figure 8).

Figure 8: Preference for governmental regulation over individual action in European countries (%)



(Carton et al., 2012, ISSP 2010 dataset, n=18269, weighted)

These results indicate that in general terms citizens prefer state regulation of environmental protection, but once specific policies are proposed, they would possibly prefer instruments exerting only little influence on their own behaviour. Such discrepancy could be a result of self-interest or distrust toward fellow citizens in general or related specifically to their reaction to the proposed policy. In some countries, the ISSP data support the latter hypothesis. For example, in Austria, Belgium, Canada, Germany, Norway, Sweden, Switzerland, and the UK, those who would prefer government to pass laws to ensure environmental protection by ordinary people have statistically significantly lower scores on combined scale of trust toward fellow citizens²⁷ (ISSP 2010 dataset, unweighted, tested by Mann-Whitney U test, all sig. at $\alpha=0.01$). No such difference was present for example for the

²⁷ Question wordings for the 2 items combined in index (average), answers on 5-point Likert-type scale:

a) Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please tick one box to show what you think, where 1 means you can't be too careful and 5 means most people can be trusted.

b) Generally speaking, do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair? Please tick one box to show what you think, where 1 means you where 1 means most people would try to take advantage of you and 5 means that most people would try to be fair.

US, Spain, Russia, the Czech Republic, or Australia. Carattini and Baranzini (2014) found a positive relationship between trust in other people and positive attitude toward carbon tax. Harring and Jagers (2013) report positive association between trust in fellow citizens to act environmentally friendly and positive response to increase of gasoline taxes.

The relationship between general trust or trust toward the government and preferences for state regulation and in consequence possibly for use of push or pull measures is likely culturally and context specific (see also Study 3). It perhaps even depends on the role of the state in environmental protection which is prevalent in given country. Kim and colleagues (2013) found a robust statistically significant negative association between specific trust in government and infringement on freedom. The greater the trust, the lesser perceived coerciveness of the measure. These are very limited results and the relationships between perceived coerciveness, policy attitudes, and trust should be furthermore explored.

Perceived coerciveness is, in other terms, perceived behavioural cost in terms of behavioural change or a limit on freedom of choice. Financial costs are also imposing new constraints on citizens' budgets, thus limiting their choices in consumption, although not all respondents may realise this constraint right away. Perceived financial cost is therefore one of the most important attributes of the policy. In taxes imposed on households or individual citizens, direct costs to citizens are readily calculated and provided to respondents. With other policies, such as taxes to business and industry, or ETS on industrial emissions, the costs imposed on production are transposed at least partially to increased prices, therefore the resulting financial constraints for citizens may be less visible.

In general, people are willing to pay some costs to mitigate climate change (e.g., Cai et al., 2010; Cameron, 2005; Cameron & Gerdes, 2007; Morrison & Hatfield-Dodds, 2011; Ščasný, Zvěřinová, Czajkowski, Kyselá, & Zagórska, 2016). It is reasonable to expect that with higher costs, levels of positive attitudes would decrease (Bannon et al., 2007; Brännlund & Persson, 2012). Visibility of costs in measures of policy attitudes usually results in a decrease in shares of positive responses compared to survey measures with no specification of costs (e.g., Chaudoin et al., 2014; Rhodes & Jaccard, 2013; Tobler et al., 2012).

It seems, however, that the relationship between costs and positive attitudes is not always this straightforward. Eriksson and colleagues (2006) found only a minor, albeit statistically significant, difference between evaluations of two levels of increased fuel tax (20% and 50%). This result can indicate that from a certain point, respondents become less sensitive to changes in costs and evaluate them as high. In a study of samples representative of the U.S. and Canadian adult population, acceptability of carbon tax increased once an increase in cost was specified in the question (USD 15, compared to non-specified tax increase). With even larger specified increase (USD 50) acceptability dropped again (Lachapelle et al., 2012). The authors argue this result to be an evidence of respondents not understanding the financial implications of taxes and of a universal aversion toward taxes, perhaps partially caused by expectations of higher costs inflicted by the tax. Once only a modest increase is proposed, this aversion may be alleviated. The increases and decreases in levels of acceptability were comparable in the two national samples, although Canadians were in general more likely to form positive attitudes toward carbon taxes (51% compared to 22% if the cost was not specified, 60% compared to 32% if a modest tax increase of USD 15 was proposed).

Although more robust and contextualised results are needed, costs, in terms of financial and behavioural impacts of policies, seem to be important factors in formation of policy

attitudes. Studies using stated preference methods offer a valuable insight in factors related to willingness to pay for, i.e., bear costs of, diverse policies (see Zvěřinová et al., 2014 for overview). The perception of what citizens think is their own fair share to contribute seems to influence citizens' willingness to pay for policies (Schkade & Payne, 1994), hence their attitudes and probably other responses to policies.

Distribution of costs and perceived fairness

Fair distributions of costs, efforts, or other policy outcomes, as well as fair procedures of policy formulation and implementation should be at the forefront of research of attitudes toward national and international climate change mitigation policies. Perceived fairness has been identified as an important explanatory factor in several studies examining attitudes towards taxation as a climate change policy instrument. Although the concept of fairness is defined and measured diversely, it has strong association with policy attitudes in most of the studies measuring it (Dreyer & Walker, 2013; Eriksson et al., 2006, 2008; Hammar & Jagers, 2007; Kallbekken et al., 2013; J. Kim et al., 2013).

Most studies dealing with fairness consider distributive justice, i.e., perceived fairness of cost distribution. Other considerations, however, may be similarly important. Procedural justice, for example, considers perceived fairness of the policy-making and implementation processes (Tyler, 2000). The two fairness judgments are conceptually independent, although they usually correlate (Dreyer & Walker, 2013). Citizens may even form positive attitudes toward policies with distributive outcomes they regard as unfair if they regard the policy-making process itself as fair (Skitka, Winquist, & Hutchinson, 2003; Tyler, 2000). Kim and colleagues (2013) examined associations of policy attitudes to several concepts of fairness: scenario fairness (whether the tax is fair), procedural fairness (whether the process of tax introduction was fair), and distributional fairness (whether the tax is equitable). Scenario fairness had the strongest direct effect in their model in both the U.S. and UK samples, while the other two concepts had statistically significant effects only in the U.S. sample.

Negative distributional effects on the poor raised concerns among urban-dwelling Norwegians (Kallbekken et al., 2013), but the association was not robust in the representative national sample, where beliefs about environmental consequences were more important (Kallbekken & Sælen, 2011). Nevertheless, such concerns may, in some situations, present a considerable obstacle in policy negotiation and implementation (Kallbekken et al., 2013).

Particularly on the international level, fairness of cost distribution is increasingly a key concern and a frequent topic in negotiations (Ringius, Torvanger, & Underdal, 2002). Certain groups can be exempted from paying or even become beneficiaries, while others may be targeted as payers. Definition of these groups should be incorporated within a policy formulation. Such definitions and distribution rules are inherently value-based and in consequence promote certain values or value orientations over others. These considerations are relevant on both national and international levels. Within the former, groups of citizens and their burdening is the subject matter, while nations or groups of nations are the focus of the latter.

Several burden-sharing rules applicable on both levels can be distinguished:

- *polluter-pays principle*: distribution based on current or historical emissions;
- *beneficiary-pays principle*: distribution based on benefits of emission reductions;
- *ability-to-pay (or capacity-to-pay) principle*: distribution based on wealth or income, includes progressive taxation;
- *equal distribution per capita (right to emit principle)*;
- *distribution based on carbon intensity (emission entitlements per GDP)*;

and rules combining different principles or criteria (Brick & Visser, 2015; Carlsson et al., 2013).

The so-called **polluter-pays principle** posits that those who emit more should pay more. According to the polluter-pays principle, countries with higher emissions should contribute to the joint global effort to reduce emissions more than countries with lower emissions. This rule has been also formulated to reflect the historical development: those who emitted more in the past (e.g., from the beginning of industrial revolution) should pay more irrespective of their emissions now (this is particularly important for developed countries that make efforts to emit less and for developing ones who do not want to slow down their progress). The principle can be applied on emission levels by country or emissions per unit of GDP or per citizen. On the domestic level, as the government cannot effectively monitor citizens' or households' emission levels, the principle can be based on the consumption of fossil fuels or energy.

The **beneficiary-pays principle**, on the other hand, assumes that recipients of the positive impacts of emission reductions (e.g., inhabitants of industrial areas with air quality improved in consequence of introducing strict regulations and emission standards) should pay more. The beneficiary-pays principle is hard to operationalise, since the benefits of avoiding climate change impacts cannot be clearly identified and ascribed to their beneficiaries.

Brännlund and Persson (2012; Cole & Brännlund, 2009) used an attribute of 'social distribution of costs' in an experiment with three levels based in common taxing principles: all pay the same amount, the same percentage of income, or those with higher incomes pay higher percentage of it (progressive taxation). Their results indicate a preference for more progressive distributions. Interestingly, there was a difference in marginal WTP for cost distribution attributes between the experiment labelled with 'tax' and the unlabelled experiment. In the first case, the values for the two more progressive levels of the attribute (equal percentage of income and higher percentage for those with higher income) were very close to each other. The value for progressive taxation was almost one third higher in the unlabelled experiment. A labelling effect according to the authors, since the tax instrument may have already been seen as matching respondents' individual criteria of a fair distribution.

Carlsson and colleagues (2013) formulated their cost distribution attribute according to four global burden-sharing rules based on historical emissions, income levels (capacity to pay), equal right to emit (emissions per capita), and current emissions. They reported a preference for rules placing smaller burdens on the US (current emissions and capacity to pay) within the U.S. sample of general public, while the situation was rather different for the Chinese sample. The Chinese seemed to have a strong preference for the historical emitters to pay and for ability to pay principle, while the WTP values for equal right to emit and current emissions were negative. These results suggest that people are prone to self-serving bias and prefer options which impose smaller costs to themselves or their country. Yet in the sample

of Swedish public, Carlsson and colleagues (2011) found no evidence of self-serving or in-group bias in preferences for distribution of emission reductions. The authors concluded, however, that the preferences and eventual biases may substantially differ among countries.

No study in the review explored distribution of costs according to levels of production (e.g., emissions per GDP) or consumption (goods produced in countries with higher emissions and sold in countries with lower emission levels), with the exception of Bristow et al. (2010), whose results on ETS policy are too inconclusive in this matter. Neither did any study concern charging those who would exceed a certain limit (reached by an international agreement or imposed by the national government). Again except for Bristow and her colleagues (2010) who included a level of taxing principle attribute exempting all adults under 4 tonnes of CO₂ emitted. This attribute, in line with the self-serving bias hypothesis, was strongly preferred among other options (mostly taxation of all adults with different revenue use).

Overall, there is no convincing evidence on universal preference for one of the burden-sharing rules at the moment. Further analyses are needed to determine if such a universal preference exists or if different groups prefer different principles and what influences their attitudes (their own interests and self-serving bias for example). Cai, Cameron, and Gerdes (2010) applied a model which included not only attributes of cost distribution on the domestic and the international levels, but also an interaction of this attribute with actors who the respondents think should bear the costs. According to their results, the effect of the distributional consequences of climate policy depends on “whether they [the distributional consequences] conform to, or conflict with, each individual’s normative opinions about (a) which groups should bear the responsibility for mitigation costs and (b) whether the burden of climate change impacts borne by the world’s poor, in the absence of mitigation, is a cause of concern” (p. 454).

Eriksson, Garvill, and Nordlund (2008) found packages combining push and pull measures to be considered by Swedish car users as unfair and unacceptable, but less so than push measures alone. Similarly, Schuitema, Steg, and Kruining (2011) found that push measures were generally considered as less fair (distributional effects) and less acceptable than pull measures in the sample of car-owners in Netherland. Higher agreement with statements “Everybody will be equally affected” and “Nature and environment will be protected” were both associated with higher perceived fairness and more positive policy attitude, regardless whether the policy measures were pull or push, and whether they targeted car use or car ownership. The situation is less clear with other policy outcomes. The authors concluded that “fairness principles reflecting egoistic concerns seem to be related to fairness and acceptability of a few policy measures only, but not to all transport pricing policies. Collective considerations (as reflected in environmental justice and equality) appeared to be more important for the fairness and acceptability of transport pricing policies” (p. 80).

Furthermore, Hammar and Jagers (2007) tested associations of three general principles of emission reductions distribution and compared segments of population based on car usage. In their sample representative of the Swedish adult population, the equity principle was seen as the fairest (“the principle that social goods (and bads) ought to be distributed in proportion to how much each and every claimant has contributed to the good or bad to be distributed”, p. 381-380). Yet in the regression model, equality principle (all citizens should reduce by the same share, e.g., 10%) had the largest statistically significant positive effect on policy acceptability. Regardless of whether the respondent was a frequent or non-frequent car user, perceiving this principle as fair was associated with higher acceptability. In the case of the

equity principle, on the other hand, positive association was statistically significant only among non-frequent car users. The third principle suggesting distribution according to the need (those who need to use cars) had similar statistically significant effect in the group of frequent car users. Hammar and Jagers (2007) therefore concluded that for frequent car users, self-interest had greater weight than general tendency to base judgements on the equity principle. The authors, however, raised caution since these results probably omit some potentially crucial background characteristics.

Perceived fairness of cost distribution and decision-making procedures is likely associated with several other concepts – trust as discussed above, values, contextual and situational factors, and other policy-specific beliefs, such as perceived policy effectiveness (see Study 3) or coerciveness. Perceived fairness of cost distribution for example mediated the influence of perceived freedom to choose travel mode in the sample of Swedish car users (Eriksson et al., 2006) – freedom to choose travel mode did not influence the acceptability of fuel tax increase directly, but did influence the perceived fairness which was in turn the main factor influencing acceptability. Therefore, fairness judgements seem to be linked to specific policy instruments and their characteristics, as well as other beliefs (see Study 3).

Existing evidence stresses the importance of distributional concerns regarding policy costs, efforts, and outcomes. Much less evidence is available on procedural justice within climate change policy making, particularly on the national level. Brown (2009, p. 223) comments on the policy making practice ignoring issues of fairness: "Climate change policy options are often discussed exclusively in the languages of science and economics that frequently hide or ignore important ethical questions". In future, more attention should be paid to ethical dimensions of policies and their implications. Citizens will most likely form their judgements of the proposed policies in relation to their beliefs about fairness, justice, and their own perceived fair share of costs and benefits. What constitutes perceived fair shares and how such beliefs relate to other individual and contextual variables is yet another important and unanswered question.

Trust in government or politicians

Although trustworthiness of other actors, such as industry, environmental organisations, experts, or fellow citizens may play an important role (Bies et al., 2013; Carattini & Baranzini, 2014; T. Dietz et al., 2007; Harring & Jagers, 2013; Stoutenborough & Vedlitz, 2014), only trust toward the government or politicians seems to be generally important for explaining policy attitudes. Trust toward the government or its officials was a statistically significant factor in 12 out of 15 models considering it. The measures assessed general trust toward the government (Hammar & Jagers, 2006; Jagers et al., 2010; J. Kim et al., 2013), beliefs about competence of governmental institutions (Lubell et al., 2007; Zahran et al., 2006), and specific trust that the government would use the revenues as promised (Kallbekken et al., 2013; Kallbekken & Sælen, 2011; Kaplowitz & McCright, 2015).

All of these measures had statistically significant effects on public responses to specific policies, mostly taxes. Only two of the studies (Lubell et al., 2007; Zahran et al., 2006) found statistically significant effects on general policy acceptability. Severson and Coleman (2015) and Dietz, Dan, and Shwom (2007), on the other hand, report non-significant coefficients. Both studies were conducted in the US. Kim and colleagues (2013) proposed a model containing both specific trust that the government will introduce the policy and general trust toward the government. They tested their model on road pricing and taxation in Germany and

the US²⁸. For taxation, both variables of trust had statistically significant coefficients (general trust influencing specific trust). This was not the case for road pricing in the US. The authors offered an explanation based on the nature of hierarchy of governmental institutions in the US, with both state and federal officials in charge. The results could have also been affected by some recent political change, such as elections, change of the cabinet, and others.

The importance of trust or faith in the government and public institutions is further evidenced by qualitative studies (Dresner, Dunne, Clinch, & Beuermann, 2006; Macnaghten & Jacobs, 1997). Macnaghten and Jacobs (1997, p. 20) argue that the institutions of government were regarded as “theoretically responsible for making moves towards sustainability, but highly unlikely to do so, since they were run for the vested interests of their own members and ‘big business’”. This sceptical, even cynical view of government appeared to reflect people’s daily experience of public institutions, which were perceived to have become less caring, more out of touch and more self-interested”.

Citizens in western democracies indeed place responsibility for tackling climate change on the government – 47% of EU inhabitants think national governments are responsible for tackling climate change, while 42% think it is a responsibility of businesses and industry, and 37% think it to be a responsibility of the EU (Eurobarometer 80.2, EU28, weighted, 2013; see Lachapelle et al., 2012 for results in the US). In the standard application of the VBN theory model, individuals are theorised to be more likely to act environmentally friendly if they ascribe the responsibility to act to themselves. In case of public responses to climate policies, however, policy attitude might be more positive if the responsibility is attributed to the government. Hart (2011) found a statistically significant positive effect of attribution of responsibility to the U.S. government on aggregate policy attitude and no statistically significant effect of attribution to individuals. The disposition of these effects was reversed once the dependent variable was an aggregate measure of individual environmentally significant behaviour.

Such placement of responsibility and its significance, together with possible issues with trust, legitimacy, or discrepancy in value orientations can create tensions between what government should do according to the citizens and what it is believed to actually do. If government acts and tries to implement some policy as it is expected to do by most of its citizens, lack of trust and legitimacy may lead to a policy failure. Moreover, Kim, Schmöcker, Fujii, and Noland (2013) conclude that the positive effect of trust in government is mediated through perceived fairness and effectiveness. Trust seems to be an underlying factor in the formulation of respondents’ policy specific beliefs. If people do not have confidence in their government (that it could create, implement, or enforce an effective policy), then the policy itself is deemed as ineffective in its anticipated implementation by the untrustworthy government.

Hence, it is important to focus on proposing and presenting policies in ways contributing to building trust and legitimacy, for example by aligning the values inherently present in proposed policies and instruments with values prevalent in the society (Matti, 2009), or by earmarking policy revenues to climate change mitigation or environmental protection and adding transparency in all stages of policy formulation and implementation.

²⁸ Other studies employing measures of general trust were conducted in Sweden (Hammar & Jagers, 2006; Jagers et al., 2010).

Revenue use

How the policy revenues will be spent means a great deal to people when evaluating policies. Kaplowitz and McCright (2015) report that a nontrivial share of the respondents of their survey expressed doubt that revenues would be used as intended. Dresner and colleagues (2006) and Kallbekken and Aasen (2010) all report that participants in various focus groups in several European countries expressed concerns over government using revenues as promised. Respondents in a study by Carattini and Baranzini (2014) ran an interesting experiment on the importance of revenue use. Respondents in their study evaluated a carbon tax proposal with no information about revenue use. Trust in government had an expected positive effect in this first measurement. Respondents who rejected this first proposal were asked to evaluate the same proposal including the revenue use option they themselves have preferred earlier. The effect of trust was opposite this time – those who did not trust the government were more likely to accept the proposal. In other words, earmarking of revenues has overcome a barrier of distrust for some of the respondents – those who distrust the government were more likely to reject the proposal in the first place, and they were also more likely to change their mind once earmarking was included in the proposal.

What kind of revenue use, then, can increase positive public response to a policy? In general, respondents seem to unambiguously prefer revenue recycling in climate change mitigation or environmental protection. Their evaluation of taxes is more likely to be positive in these cases compared to revenue use in other policy domains or in order to keep the net tax the same. The positive effect has been evidenced in Switzerland (Carattini & Baranzini, 2014), Norway (Kallbekken & Aasen, 2010; Sælen & Kallbekken, 2011), the US, and Canada (Kaplowitz & McCright, 2015; Lachapelle et al., 2012).

There may, however, be other reasons than trust why earmarking is so important. Sælen and Kallbekken (2011) tested the “trust hypothesis” with no success, although previous evidence summarized above supports it in general. Although the authors suggested that this result may be specific to Norway and hence the validity of the hypothesis may depend on national context, they also proposed an alternative hypothesis, which is supported by their data. Similar to what Dresner and colleagues (2006) learned from focus groups on green tax reform, Sælen and Kallbekken (2011) concluded that the demand for earmarking is a result of concern about environmental effectiveness of taxes. Taxes may not generally be regarded as behaviour-changing instruments and may rather be understood as instruments of raising revenues for the state. Unless these revenues are used for the cause, the tax itself can be seen as ineffective in reaching the stated goal.

This explanation is further supported by Steg, Dreijerink, and Abrahamse (2006) who conclude that revenue use within the energy domain has positive effect on perceived effectiveness of the policy. Moreover, pull measures were perceived as more effective when funded from within the same domain rather than general budget. Hsu, Walters, and Purgas (2008) tested two diverse descriptions of an increase in gasoline tax. When the tax increase was described as a means of funding a technological solution, rather than as a behaviour-changing instrument, respondents evaluated the increase more positively. While other factors are certainly present, one of the differences between these two descriptions is the visibility of earmarking as a component of the policy instrument.

On the other hand, earmarking is not a substitute for policy effectiveness (Baranzini & Carattini, 2017). Therefore, the two may support each other, but earmarking is not a guaranteed solution for policies being evaluated and perceived as ineffective.

In sum, transparency in revenue use and policy communication can be highly recommended as means of increasing the readiness of the public to accept or even support new policies. For one, clear and transparent use of revenues may increase trust in the government and its actions regarding climate change. Second, it can increase perceived effectiveness of the instrument or policy package. To these ends, earmarking revenues within the domain of climate or environmental policy is recommended, since more complicated mechanisms of tax reliefs across domains or sectors of economy are less likely to be understood by the citizens and hence less transparent.

4.4. Socio-economic and demographic variables

Most reviewed studies include at least gender as a control variable in the analysed models, many include education, age, income, or ethnicity (see Table 9), few include number of children (Bannon et al., 2007) or members of the household (Carattini & Baranzini, 2014; Kotchen et al., 2013), marital status, or religion (Bies et al., 2013; Chaudoin et al., 2014; Hersch & Viscusi, 2006). Since the results regarding the less prominent socio-demographic variables are scarce, it is hard to reach any general conclusions. With the abundance of results regarding the more prominent individual socio-economic and demographic characteristics, the situation is paradoxically not very different.

The evidence on associations between the basic socio-demographic variables and attitudes toward general climate change policy endeavours and toward taxes is mixed at best. Only some of the characteristics seem to have a steady relationship with policy attitudes in terms of its orientation, but not necessarily strength; namely education, car ownership or use and income to a certain degree.

Education

Higher education has, in most reviewed cases, a positive relationship with positive evaluation of specific tax proposals, as well as general policy attitudes (Carattini & Baranzini, 2014; Hammar & Jagers, 2006, 2007; Hersch & Viscusi, 2006; Hsu et al., 2008; Kallbekken et al., 2013; Kotchen et al., 2013; Leiserowitz, 2006; Lubell et al., 2007; McCright, Dunlap, et al., 2016; O'Connor et al., 2002; Zahran et al., 2006). In several cases, addition of some other variables, such as income (Kallbekken & Sælen, 2011) or climate change concern, trust, and others (for example Carattini & Baranzini, 2014) resulted in statistical insignificance of education although it was significant before the addition of these variables. Since higher education is often a positive predictor of environmentally significant behaviours and environmental values, its effect is likely mediated through these or other variables in models of policy attitudes.

The effect of education is not, however, as universal as it may seem. In a study applying the same model on four different classes of policies and an aggregated index (Stoutenborough et al., 2014), education had a positive coefficient in the case of attitudes toward renewable energy and of the aggregated attitude. The coefficients were not statistically significant in other cases. Education may therefore have a more important role or an independent unmediated effect in some cases or policies compared to others (Kachi et al., 2015). Nevertheless, based on the evidence accumulated so far, it is safe to assume that more educated people are more likely to form positive attitudes toward climate change mitigation policies or hold values and beliefs positively affecting their policy attitudes.

Car ownership and usage

Car use or ownership often has a statistically significant negative effect on positive policy evaluation (Carattini & Baranzini, 2014; Hammar & Jagers, 2007; Hsu et al., 2008; Krupnick, Harrington, & Alberini, 2001; Löfgren & Nordblom, 2009). Such effect is not large or barely statistically significant in some cases (Harring & Jagers, 2013; Kallbekken & Sælen, 2011) or is interacting with other variables. For example, car ownership had a negative effect only among those who are distrustful of politicians in a study by Hammar and Jagers (2006). Other variables are usually of greater importance (Kallbekken & Sælen, 2011).

Interestingly, the effect is not endemic to studies of fuel taxes – number of cars in a household had a statistically significant negative effect on actual voting behaviour of Swiss

referendum voters on the green tax reform, the energy conservation package, and the solar initiative (Thalmann, 2004). The effect was independent on the effect of household income. The number of cars had also a negative effect on attitudes toward an economy-wide carbon tax (Carattini & Baranzini, 2014), although income was not included in the tested model and hence the number of cars could also reflect the effect of wealth (yet, as discussed later, the effect of income is far from clear-cut).

Car use or ownership is one of the few currently used variables reflecting respondents' reported context or *lock-ins* in their lived situations formed by existing institutions and practices. Existing behaviours, habits, and practices may influence citizens' attitudes and opinions about policies which could change their situation or institutions related to it. Inferring from the evidence, the prevalent negative effect of car ownership and usage, although not always so strong, clearly indicates that situational factors, i.e., factors reflecting the material and habitual situation of the individual, may be of importance. It is therefore surprising that so little attention is paid to this class of factors at the moment.

Income

Although the evidence is not unanimous, income often has a positive association with readiness to accept or support policies (see Table 9). In stated preference studies and studies providing respondents with the exact amount of costs (or at least a specific range) they would bear, income had a positive association with the dependent variable regardless whether general or policy-specific attitudes were measured (Bannon et al., 2007; T. Dietz et al., 2007; Hersch & Viscusi, 2006; Hsu et al., 2008; Ivanova, 2011; Kallbekken & Sælen, 2011; Kotchen et al., 2013; Longo et al., 2011; Shwom et al., 2010). On the other hand, in studies providing no information on cost, income is more often reported as having no statistically significant effect (Bies et al., 2013; Kachi et al., 2015; Lubell et al., 2007) or having mixed or not robust positive relationship in different models (Chaudoin et al., 2014; McCright et al., 2013; Stoutenborough et al., 2014).

For example, Stoutenborough, Bromley-Trujillo, and Vedlitz (2014) report a positive association in four out of six models. In the study, income had no association with attitudes toward taxing industry and market incentives, although it does have a positive association with attitudes toward funding renewable energy, increasing fuel efficiency, and increased fuel prices (Stoutenborough et al., 2014). Similarly, the results of Study 1 presented in this dissertation show that respondents' subjective statuses (hence their evaluation of their current economic situations) have a statistically significant effect only in a model of the composite measure of willingness to make economic sacrifices, not in the model of the composite measure of attitude toward environmental policy in general.

The possible effect of cost visibility on relevance of income as a predictor of policy attitudes implies several considerations. It furthermore supports the recommendation to include costs in measurements of policy attitudes whenever possible and pertinent. Moreover, citizens may in principle have strong positive attitudes and high readiness to accept environmental policies, but they are constrained by their budgets and economic concerns, as well as by day-to-day needs, habits, and used and provided infrastructures. While it is valuable to know that such positive attitudes, or even support, to climate action in principle exist, attitudes formed with awareness of such constraints are much more informant and policy relevant.

Gender and age

The effects of age and gender are hard to discern. Drews and van der Bergh (2015) in their review omit income, gender, and age from their synthesis with reference to limited space. As is apparent from Table 9, the reported effects are mixed, with most models reporting statistically insignificant coefficients of gender and age. Regardless of whether they examine attitudes toward general policy action or toward taxes, most studies found no statistically significant differences between men and women. In 17 models (out of 56) being female was associated with more positive attitudes and responses²⁹. Only few studies found the opposite association. No direct explanation or interpretation of such results has been offered.

Leiserowitz (2006) found that American women are more concerned about climate change, which is in line with conclusions from the research on environmental concern (Gifford & Nilsson, 2014). Being female was also associated with more positive attitudes to climate policies and climate taxes in the model with socio-demographic variables only. But after inclusion of other variables, such as holistic negative affect and cultural value orientations (egalitarianism, fatalism etc.), the effect of gender was reversed in case of climate taxes and nonsignificant in case of climate policies in general. Viscusi and Zeckhauser (2006) obtained somewhat similar results in the sample of Harvard graduate students – men were concerned to a lesser extent than women, but once risk beliefs and concerns were controlled for in the final model, men had higher WTP values than women. Similarly, Hammar and Jagers (2007) report positive association for women in two out of five model variations differing in inclusion of perceived fairness variables and segmentation of public. Being a woman had statistically significant positive effect in the model of non-frequent car users, while for frequent users, no statistically significant effect was observed. Kachi, Bernauer, and Gampfer (2015) report a statistically significant positive association between being a woman and more positive policy responses in three models out of six (behavioural intention in Germany and the US, and WTP in the US, for attitudes in both countries, no statistically significant effect was found).

These results suggest that the effect of gender is likely mediated through other variables or may interact with them and is also likely linked to the nature of the dependent variable. Joireman and Liu (2014), for example, focused on gender differences in WTP for reducing global warming and found that among those more concerned with future consequences of their own behaviour, women are more likely to form positive attitudes toward climate policies, while among those who do not consider future consequences of their actions so often, the opposite is true.

Similar to gender, there is no clear conclusion on the effect of age either. Considering only the studies with samples representative of the general public, 8 models resulted in no statistically significant effect, 7 reported a positive association, and another 7 a negative association. In a study by Kachi, Bernauer, and Gampfer (2015), age was positively associated with behavioural intention and WTP for climate action in general. This association was present in samples of the U.S. and German public. McCright, Dunlap, and Marquart-Pyatt (2016), on the other hand, report negative association between age and WTP in post-communist countries, but no statistically significant association in Western Europe. Moreover, McCright, Dunlap, and Xiao (2013) report an indirect negative effect of age mediated through perceived scientific agreement and global warming beliefs.

²⁹ (Cai et al., 2010; Chaudoin et al., 2014; Hsu, Walters, & Purgas, 2008; Kachi et al., 2015; Krupnick, Harrington, & Alberini, 2001; McCright, Dunlap, & Marquart-Pyatt, 2016; Rickard, Yang, & Schuldt, 2016; Stoutenborough, Bromley-Trujillo, & Vedlitz, 2014; Zahran et al., 2006, 2006)

Although no clear conclusions can be drawn from the existing results on the role of some socio-economic and demographic characteristics like age and gender, social-psychological theories and models, like the VBN theory and the TPB, assume these variables are background variables affecting the variables further in the causal chain. Socio-economic and demographic variables affect environmental behaviours and policy attitudes through value orientations and general worldviews and therefore are not included in these models. Nonetheless, from the policy communication perspective, these variables are of key importance, since they help to identify the distinct segments of populations and allow targeted communication.

4.5. Study 2: Temporal and spatial framing of public spending on climate change and air pollution³⁰

Representative data from the Norwegian Citizen Panel are examined in this study in order to fill some gaps in understanding of formation of attitudes toward climate change and air pollution and to supplement existing research on psychological distance of environmental impacts and preferences for delayed action by experimental survey results. Attitudes of Norwegian citizens toward public funding of policies aiming to reduce environmental risks are explored with respect to the targeted issue, timing, and spatial scale of proposed policies.

While Norwegians are very inclined to spend money on policies reducing risks from both climate change and air pollution, important differences exist between citizens with different political orientation.

4.5.1. Methods

Data

Data from the second wave of the Norwegian Citizen Panel survey (2014) are analysed in this study. The panellists were recruited prior to the first wave of the panel via random selection from the national population registry. The total of 4,905 respondents answered the first wave and 3,372 answered the second. Respondents were randomly assigned to two experimental groups and answered different questions (see Supplementary Materials on the web for the codebook, design and question wordings; <http://digsscore.uib.no/panel>).

The survey was administered by web and panellists were mailed a postal notice about their selection into the panel together with instructions to fill out the questionnaire. Panellists who have registered in the first wave were invited and eventually reminded to participate in the second wave by several e-mail reminders (see Høgestøl & Skjervheim, 2014 for details). No financial reward was offered to the participants except the possibility to win a travel gift card (25 000 NOK). For representativity statistics and sample description see Ivarsflaten et al. (2014).

Experimental design

A random subsample of respondents ($n=1,714$) was further randomized into 8 subgroups. Each of these subgroups received a single question on degree of agreement with the use of public funds to finance environmental policy measures. These measures were specified in three key attributes – spatial scale, timing, and targeted risks (issues). There were two distinct levels in each attribute, thus constituting a 2x2x2 factorial design. The measures aimed at reducing risks of either climate change or local air pollution (issue attribute), and either in Norway or in the world (spatial scale). They would also be implemented either immediately, or in 50 years (timing). All possible combinations of these attributes (8 in total) were worded identically (e.g., *To which extent do you agree or disagree with the following statement: Norwegian public funds should be spent on measures that reduce the risk of climate change in Norway immediately*).

³⁰ Study 2 was elaborated in collaboration with Endre Tvinneheim from the Uni Research Rokkan Centre in Bergen and Elisabeth Ivarsflaten from the Department of Comparative Politics, University of Bergen in Norway within the Norwegian Citizen Panel initiative (DIGSSCORE). I hereby thank both for their comments and help. The results of this study were presented at the opening conference of the DIGSSCORE research project in June 2016 in Solstrand, Norway.

Responses were indicated on 7-point Likert-type scale. Each respondent was presented with only one combination. Apart from a negligible proportion of item non-response, no missing values were present in the dependent variable. The distribution of the dependent variable for the specific combinations of attributes is presented in Figure 9. A binary variable was constructed by dividing the dependent variable in two categories – agrees (three categories) and does not agree (four categories including the mid-point *neither agree nor disagree*). As can be seen in Figure 9, the distribution supports this division. Only a minority of respondents have chosen the mid-point category.

The effects of experimental treatments and their interactions were assessed by regression models. Since the dependent variable is ordinal in its nature, both ordinal regression (proportional odds) with the original variable and binary logistic regression with the dichotomized version were calculated. Because the results of both models are essentially uniform (with one exception commented on below), coefficients for the binary logistic model are presented for the sake of simplicity of the interpretation.

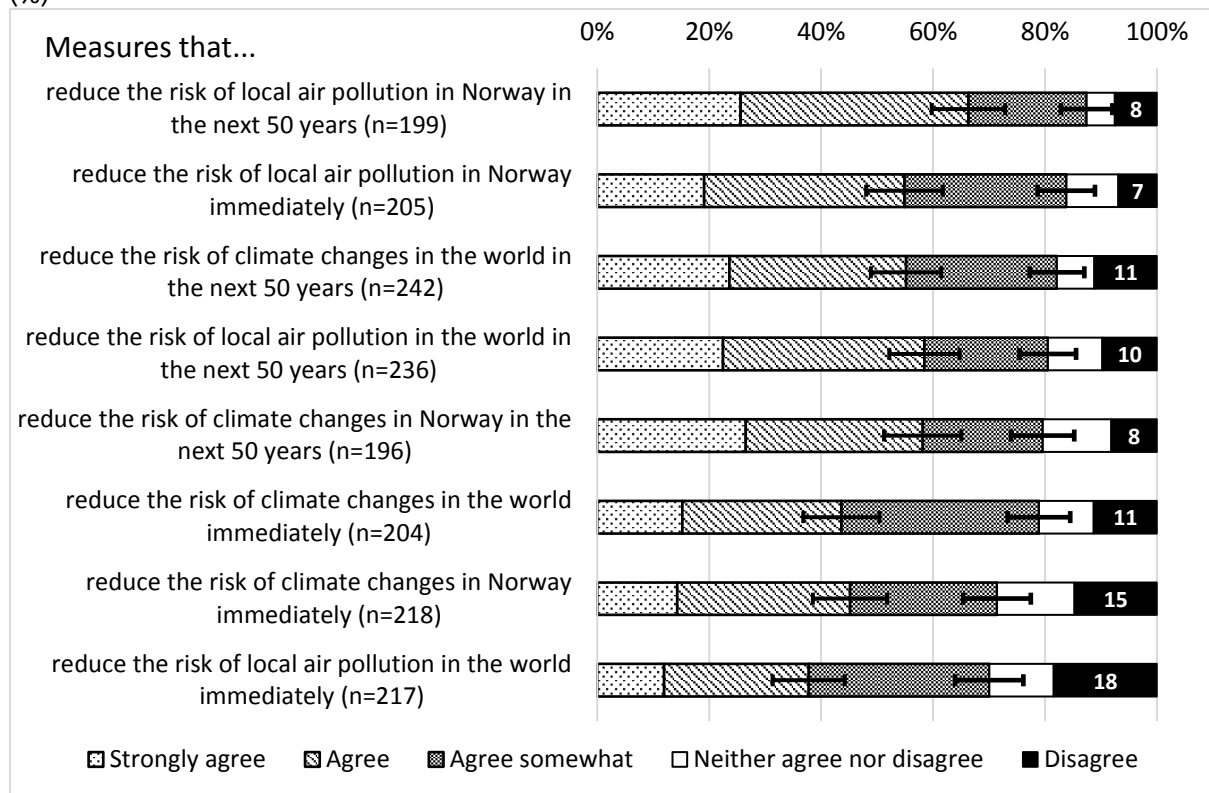
The basic model included only dummy variables representing the policy attributes and their levels. Full model included dummy variables and their interactions. Inclusion of the interaction terms has yielded higher values of the variance inflation factor (VIF) and lower values of tolerance, posing some possible multicollinearity issues if stricter criteria were applied. For this reason, full-factorial model is omitted from interpretation.

4.5.2. Results

In general, most Norwegians are willing to spend public funds on reducing risks from climate change or air pollution (between 70% and 87%, see Figure 9). Only a minority of respondents in all experimental groups expressed downright disagreement. The differences between attitude distributions in most of the scenarios were not statistically significant (see Figure 9 for confidential intervals). The shares of respondents choosing one of the three categories of agreement are consistent between most scenarios, but with three clear exceptions. The respondents presented with the scenario of spending on reducing long-term air pollution in Norway agreed with it most often, whereas respondents presented with reducing air pollution in the world immediately agreed least often. Smaller shares of agreeing respondents are also present in the condition of immediately reducing risks of climate change in Norway.

There are no statistically significant differences between the shares of respondents agreeing with funding in the four scenarios included in the temporally distant experimental condition. With the sole exception of reducing risks of local air pollution in Norway immediately, all scenarios in this time related experimental condition (i.e., immediately) yielded lower levels of agreement, with respondents tending to choose more cautious or hesitant categories. In case of risks related to climate change, the differences in the shares of agreeing respondents are not statistically significant, while for air pollution risks, funding for immediate risk reduction on global scale received statistically significantly less agreeing answers than the two other homeland air pollution scenarios.

Figure 9: Distribution of agreement with statements about spending on environmental measures (%)



Note: 95% confidence intervals for proportions of those who agreed or agreed strongly (2 aggregated categories) and those who agreed, agreed somewhat, and agreed strongly (3 aggregated categories); “Disagree” represents 3 aggregated categories from disagree somewhat to disagree strongly.

The absence of obvious stark differences between answers in different experimental conditions suggests that the underlying attitudes are strong and not very susceptible to change of framing or context. Yet, interactions of different experimental conditions can very well lead to similar distributions of answers. Once interaction terms are introduced into the regression model (Table 10), the interpretation of the main effects changes. These coefficients now measure an effect of change in the given attribute, i.e., the odds ratio, while both other attributes are zero. If we recalculate the models with all possible ways of coding of the binary independent variables, the intercepts of these recalculated models provide baseline odds, i.e., odds for different scenarios (with no change in the attributes).³¹

³¹ The interpretation of the exponentiated coefficients $\text{Exp}(B)$ is not straightforward in logistic regression models with interactions. While the exponentiated constants represent the baseline odds for the different scenarios indicated in the table, the $\text{Exp}(B)$ of the main effects denote odds ratios for the change of a single attribute in the baseline scenario – the arrow signifies this change from the reference category (0). For example, odds ratio for the change in spatial scale from local to global in case of reducing risks of air pollution in 50 years from now is 0.508. This means that the odds of agreement with funding a global policy are lower by approximately 41% than the odds of agreement with funding a local one.

Note that by subtracting the value of the constant for air pollution in Norway in 50 years from the constant for air pollution in the world in 50 years, we get the main effect of change in spatial scale in this scenario (not exponentiated; $1.362 - 2.04 = -0.678$). Reversely, the change from global to local would have the value of 0.678 ($\text{Exp}(B)=1.97$).

Last, the exponentiated interaction terms represent the ratios by which the odds ratios change. This can be illustrated by computing the coefficients. Adding the main effect coefficient of change in spatial scale in air pollution in 50 years (not exponentiated) to the interaction term of spatial scale and issue (not exponentiated) results in value of the main effect of change in spatial scale for climate change in 50 years: $-0.678 + 0.970 = 0.292$. This way, all the main effects can be easily computed.

Table 10: Logistic regression model of experimental treatments with interactions ($n=1714$)

<i>interaction terms:</i>				Exp(B)	Confidence Interval (95%)		B	SE
spatial / time				1.003	0.620	1.624	0.003	0.246
spatial / issue				2.637***	1.631	4.264	0.970	0.245
time / issue				1.148	0.710	1.854	0.138	0.245
constants: (baselines)								
g	Norway	in 50 y.	air pollution	7.692***			2.040	0.198
d	world	in 50 y.	climate change	4.893***			1.588	0.161
e	Norway	now	air pollution	4.811***			1.571	0.172
h	world	in 50 y.	air pollution	3.906***			1.362	0.153
c	Norway	in 50 y.	climate change	3.655***			1.296	0.159
b	world	now	climate change	3.523***			1.259	0.159
a	Norway	now	climate change	2.623***			0.964	0.144
f	world	now	air pollution	2.450***			0.896	0.143
main effects:								
→ world		in 50 y.	air pollution	0.508***	0.325	0.794	-0.678	0.228
→ world		in 50 y.	climate change	1.339	0.883	2.030	0.292	0.212
→ world		now	air pollution	0.509***	0.338	0.767	-0.675	0.209
→ world		now	climate change	1.343	0.905	1.993	0.295	0.202
→ now	Norway		air pollution	0.625***	0.395	0.990	-0.469	0.234
→ now	Norway		climate change	0.718*	0.481	1.071	-0.332	0.204
→ now	world		air pollution	0.627***	0.426	0.923	-0.466	0.197
→ now	world		climate change	0.720	0.477	1.087	-0.329	0.210
→ climate change	Norway	in 50 y.		0.475***	0.302	0.748	-0.744	0.231
→ climate change	Norway	now		0.545***	0.362	0.822	-0.607	0.210
→ climate change	world	in 50 y.		1.253	0.835	1.880	0.225	0.207
→ climate change	world	now		1.438*	0.970	2.130	0.363	0.201
Nagelkerke R²				0.042				

* statistically significant at p-value 0.1, ** at 0.05, *** at 0.01

The coefficients for main effects indicate greater effect of temporal and spatial policy attributes for air pollution, while main effects for climate change as a reference category are mostly not statistically significant. Dealing with air pollution is more often approved if done on local level and further in the future. Moreover, preference for delayed action seems to be universal in this setting for both issues. First, the odds for the second most positively evaluated policy, i.e., reducing risks of air pollution in Norway immediately (in comparison with in 50 years from now), is 38% lower. Similarly, if the time horizon changes from 50 years to now in the case of reducing risks of local air pollution globally, the odds of agreeing are 37% lower. The effects in climate change scenarios are not statistically significant at the 0.05 level. While variation in geographical scale and issue interact, the effect of change in the time horizon is stable. None of the two possible interactions of this factor have a statistically significant effect.

Second, policies for reducing risks of local air pollution in either 50 years or immediately are less acceptable if the risks are to be reduced in the world rather than Norway alone. Both odds of agreement with funding of these two global policies are 49% lower than for national reduction. In case of climate change, however, there is only a hint of an opposite effect of such

change in spatial scale and both coefficients are not statistically significant. Similarly, for reducing risks in Norway, air pollution yields higher shares of agreement than climate change. If the issue at hand changes from air pollution to climate change in the national context, the odds are lower by 45% and 52% for acting now and in 50 years respectively. Agreement with funding for local air pollution risk reduction is much stronger when confined to Norway. Since air pollution was formulated as "local", respondents were not very keen to fund its reduction throughout the world. On the other hand, there are no strong statistically significant effects for issue change on global level, although the odds are higher by 44% (sig. at 10% level) if the issue changes to climate change.

The two effects present in air pollution conditions, i.e., increase in approval following delayed and local action, reinforce each other. This reinforcement results in the largest difference present in the variable (air pollution in Norway in 50 years as the most often approved scenario and air pollution in the world immediately as the least approved one), while it also leads to no obvious difference in the scenarios combining delay with global action and immediate action on local level.

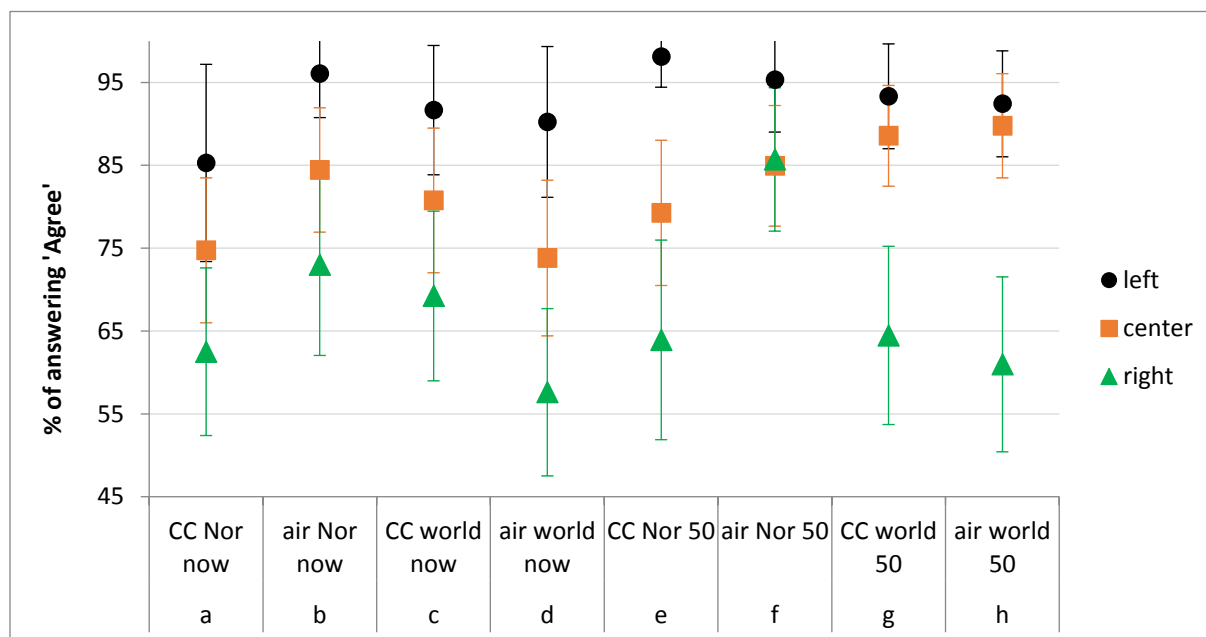
Although they have many commonalities and are connected, the two environmental issues are evaluated differently. Agreement with spending on reducing risks of climate change appears to be more consistent between the experimental conditions, although the idea of reducing these risks in Norway immediately generates lower shares of agreeing answers. Again, this is presumably a result of reinforcement between the two tendencies to delay action and attribute global level to climate change, but the effects are too small to arrive to a safe and robust conclusion. Reducing risks of air pollution in the same conditions, on the other hand is the single most agreeable proposition of those in the immediate experimental condition. Air pollution is clearly locally bounded and there is a decrease in agreement with spending on it if transposed to global context.

Political orientation

The results in general support the expected relationship of political orientation and policy attitudes. Financing almost all presented policies is less acceptable for those who claim to be oriented to the right compared to those who are inclined to the left (see Figure 10) – apart from the proposition to reduce risks of air pollution in Norway in 50 years to which around 90% of the respondents from all three groups provided affirmative responses. Centre oriented respondents usually do not statistically significantly differ from both left or right oriented ones and their shares answering positively are in the mid-range between the other two groups.

Similar to the overall structure of answers presented in Figure 9, there are no apparent differences in shares of agreeing responses within the three population segments based on political orientation. There are only three statistically significant differences. In the combination of reducing risks globally in the distant future, the shares of left oriented and centre oriented respondents agreeing with public funding are the same, regardless the issue at hand. On the other hand, left oriented respondents are keener to agree with spending on reducing risks of climate change in Norway in 50 years than the other segments.

Figure 10: Percentage of respondents choosing one of three categories of agreement grouped by political orientation (and 95% confidence intervals; $n=1714$)



However, the regression results reveal some interesting differences in how different segments evaluate proposed policy scenarios (see Table 11). Apparently, different groups of respondents based on their political orientation seem to assign different weights to the geographical scale attribute presented in the question. Interestingly, both those on the right and on the left have lower odds of agreement if the air pollution scenario changes from national to global level (by 58% and 60% respectively for right and left orientation in the delayed action scenario, and by 57% and 60% respectively in the acting now scenario; all significant on 5% level). Changing the geographical scale from national to global level does not affect the attitudes in the climate change scenarios except for the centre oriented respondents. In both delayed action and acting now, the odds increase by 85% and 86% respectively. Thus, if the problem is said to be dealt with globally, support for climate change scenarios is higher in the segment of population politically oriented to the centre, while for those on the left and right, this attribute does not make a difference. In line with the results of the model without political orientation, changing the issue from air pollution to climate change does no good for the agreement with public spending if the policy is said to be local. In all analysed population segments, this change leads to odds lower at most by 56% (left; in 50 years) and at least by 40% (centre; acting now). Nonetheless, the same issue change in global policy schemes has no statistically significant effect.

Interestingly, there is a universal preference for delayed action among the respondents oriented to the left. All coefficients for change from acting in 50 years to acting now are negative in this segment of population, i.e., the odds are lower for all acting now scenarios (by 38% to 50%). There is no such universal preference in the other two population segments. The change in time scale, however, has some effect for air pollution policies among centre oriented respondents (odds lower by 45% in both scenarios).

Table 11: Logistic regression model with interactions, incl. political orientation (centre orientation as reference category)

<i>interaction terms:</i>	scenario (reference categories)			Exp(B)	Confidence Interval (95%)		B	SE
geographical / time				1.007	0.610	1.662	0.007	0.256
geographical / issue				2.541***	1.541	4.190	0.932	0.255
time / issue				1.234	0.750	2.028	0.210	0.254
geographical / left				0.546	0.220	1.356	-0.606	0.464
time / left				0.916	0.846	2.412	-0.088	0.452
issue / left				0.909	0.548	1.567	-0.096	0.455
geographical / right				0.580*	0.343	0.981	-0.545	0.268
time / right				1.429	0.846	2.412	0.357	0.267
issue / right				0.926	0.548	1.567	-0.076	0.268
constants: (baselines for centre)								
	Norway	in 50 y.	air pollution	8.147***			2.098	0.255
	Norway	in 50 y.	climate change	2.677***			0.985	0.197
	Norway	now	air pollution	4.464***			1.496	0.223
	Norway	now	climate change	2.677***			0.985	0.197
	world	in 50 y.	air pollution	5.931***			1.78	0.237
	world	in 50 y.	climate change	7.328***			1.992	0.240
	world	now	air pollution	3.272***			1.185	0.215
	world	now	climate change	4.986***			1.607	0.238
main effects (for males):								
→ world		in 50 y.	air pollution	0.728	0.420	1.263	-0.317	0.281
→ world		in 50 y.	climate change	1.850*	1.082	3.162	0.615	0.273
→ world		now	air pollution	0.733	0.437	1.228	-0.311	0.263
→ world		now	climate change	1.862*	1.114	3.112	0.622	0.262
→ now	Norway		air pollution	0.548*	0.318	0.945	-0.602	0.278
→ now	Norway		climate change	0.676	0.410	1.113	-0.392	0.254
→ now	world		air pollution	0.552*	0.327	0.93	-0.595	0.267
→ now	world		climate change	0.680	0.395	1.172	-0.385	0.277
→ climate change	Norway	in 50 y.		0.486**	0.283	0.837	-0.721	0.277
→ climate change	Norway	now		0.600*	0.363	.990	-0.511	0.256
→ climate change	world	in 50 y.		1.235	0.718	2.126	0.211	0.277
→ climate change	world	now		1.524	0.902	2.575	0.421	0.268
→ left	Norway	in 50 y.	air pollution	4.468**	1.590	12.558	1.497	0.527
→ left	Norway	in 50 y.	climate change	4.061**	1.624	10.154	1.401	0.468
→ left	Norway	now	air pollution	4.093**	1.591	10.529	1.409	0.482
→ left	Norway	now	climate change	3.720**	1.553	8.91	1.314	0.446
→ left	world	in 50 y.	air pollution	2.438*	1.028	5.784	0.891	0.441
→ left	world	in 50 y.	climate change	2.216	0.931	5.278	0.796	0.443
→ left	world	now	air pollution	2.234	0.999	4.994	0.804	0.410
→ left	world	now	climate change	2.030	0.853	4.833	0.708	0.443
→ right	Norway	in 50 y.	air pollution	0.498*	0.279	0.889	-0.698	0.296
→ right	Norway	in 50 y.	climate change	0.461**	0.273	0.777	-0.775	0.267
→ right	Norway	now	air pollution	0.711	0.417	1.212	-0.341	0.272
→ right	Norway	now	climate change	0.658	0.406	1.068	-0.418	0.247
→ right	world	in 50 y.	air pollution	0.288***	0.171	0.485	-1.243	0.265
→ right	world	in 50 y.	climate change	0.267***	0.156	0.457	-1.320	0.273
→ right	world	now	air pollution	0.412***	0.251	0.676	-0.887	0.253
→ right	world	now	climate change	0.382***	0.226	0.645	-0.963	0.267
Nagelkerke R²	0.141							

* statistically significant at p-value 0.1, ** 0.05 *** 0.01

Discussion

The overall pervasive willingness to use public funds to reduce risks of air pollution and climate change in all scenarios and climate change risks in the world specifically allow for some positive expectations. On the other hand, the high percentage of respondents who agree with public spending on climate change or air pollution means, among other things, that the variance of responses in different experimental conditions is low. The skewed distributions are presumably a consequence of generality of the policy proposal which did not include any information on the amount of public spending or on individual costs to the respondents. These are important predictors of policy attitudes (Bord et al., 2000) and would probably decrease levels of public agreement with policy funding.

The results further support previous conclusions on relevance of global climate change framing despite the assumption that people see it as a distant threat that does not affect them (e.g., Gattig & Hendrickx, 2007; Spence & Pidgeon, 2010; Spence et al., 2012). The distant impacts are relevant and can increase positive attitudes toward climate spending. Spence and Pidgeon (2010) summarize evidence suggesting that distant impacts of climate change are viewed as more serious than local impacts. Haden and colleagues (2012) found that while adaptation is driven mostly by psychologically proximate climate change concerns, mitigation is motivated by those psychologically distant. Although a lack of locally and personally relevant information can be a barrier to behavioural change or action (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007), it does not mean that global framing and information on global impacts are irrelevant.

The information should above all pay attention to existing values people hold, their beliefs about their own responsibility to act (Krosnick, Holbrook, Lowe, & Visser, 2006) and their mental representations of climate change (Bostrom et al., 2012). These representations can be framed both locally and globally. In fact, the two levels are very likely to interact, especially in regard of one's sense of belonging and attachment. Therefore, it could be misleading to explore them as discrete (Devine-Wright, Price, & Leviston, 2015). Spence and Pidgeon (2010) even suggest that framing information locally can focus respondents on aspects of climate change that they perceive as less important. Brügger and colleagues (2016) point to possible adverse effects of proximising climate change, namely negative emotional reaction leading to detachment or denial.

Not only can people see distant consequences as more serious (Spence & Pidgeon, 2010), but are also more likely to act upon relevant pro-environmental attitudes if primed by distant-future time perspective (see also Brügger et al., 2016). These results, as well as results presented in this study, generally support the notion that climate change can be framed both globally and locally with success and without large losses of positive policy attitudes, especially in populations who are inclined to agree with public spending in the domain in general.

The results are in line with existing research in the US, indicating that climate change perceptions and policy attitudes are connected to political orientation. People holding certain political views are attributing different weights and perhaps meanings to different policy characteristics. Achieving public-wide popular support would mean making trade-offs between different values held by different groups (Shwom et al., 2010).

The results have also shown that broad and general attitudes toward climate and air pollution policies are quite stable, although some important effects are present. The consistency also implies that the global narrative of climate change is indeed viable in Norway

and can be used to raise support or acceptance for immediate action on global level. Rather than framing climate change either locally, or globally, policy makers should try to develop narratives bridging the division of global and local, focusing on citizens' context and attachment to places and lived environment, consequently making climate change a relevant issue.

4.6. Study 3: Policy characteristics

4.6.1. Introduction

Policy specific variables play an important role in people's considerations of (climate change mitigation) policies (see section 4.3). This role, however, has so far not been explored in detail. Research is needed particularly with respect to what factors are related to subjective perceptions of policy characteristics and their role in existing and emerging theoretical models of policy attitudes (see section 4.1).

The main goal of this study is to identify the dominant factors related to perceived policy characteristics, namely perceived effectiveness and infringement on freedom, and to explore the possible variability of significance of these factors across a diversity of climate change mitigation policies. The key question of this study is whether all policy characteristics enter the decision process in a similar way and in interplay with the same factors, or whether they have diverging roles. The study does not aim to confirm a specific theoretical model. Rather, it explores whether common factors or patterns are present in public perception of policy characteristics.

Public perception of two policy characteristics, namely effectiveness and infringement on freedom, is explored on representative samples of the public in Poland, the United Kingdom, and the Czech Republic. The factors hypothesised to be related to the perception of these characteristics were formulated and measured based on the Value-Belief-Norm theory (Stern, 2000; Stern et al., 1999) and the results of a comprehensive literature review presented in chapter 4. The study is cross-sectional and correlational in its nature; therefore, causal claims cannot be tested. Yet, it points out the role of policy characteristics in similar studies and sheds new light on interpretation of existing data. Testing causal paths using Structural Equation Modelling and cardinal, rather than ordinal or categorical, dependent variables can be a further step in the analyses.

In the Methods section, a description of the data collection process and sample characteristics are provided, including the handling of missing data and construction of key variables. The dependent variables are analysed in two steps. First, differences between those who provided their views and those who did not form an opinion or did not know how to answer are discussed. Second, the results of multinomial logistic regression models and multivariate probit models of perceived characteristics of six different climate change mitigation policies are presented and discussed.

Perceived effectiveness and infringement on freedom

As discussed in section 4.3, perceived effectiveness can be defined and measured in a broad variety of ways, including environmental effectiveness (e.g., prevented temperature increase, decrease of emission levels, prevented environmental damage etc.) or effectiveness in changing behaviours, promoting beneficial habits, and others. Both these areas of policy effectiveness have been shown to greatly affect respondents' views on climate change mitigation policies. In the present study, effectiveness was defined as perceived likelihood of fulfilling the goal of greenhouse gas emissions reduction by 80% in 2050, which is the target presented in the EU 2050 Roadmap (European Commission, 2011).

Setting the goal to 2050 is a long-term perspective and respondents can have doubts that any policy would have such a long-term effect. 62% of the Czech citizens and 50% of the British surveyed within this study think the 80% by 2050 goal to be too ambitious.

Interestingly, only 36% of the Polish citizens think the same. On the other hand, some people may also be sceptical that any policy would have a prompt effect in reaching a short-term goal. One fifth of the Czech (21%) and the British (19%) respondents and 16% of the Polish respondents thought the current binding goal of 20% emission reduction in 2020 too ambitious, although the EU as a whole was on the trajectory to overachieve this ambition (European Commission, 2015) before and during the survey was running in 2015.

The effect of infringement on freedom, or coerciveness, have not yet been properly explored. So far, a wide-spread preference for pull rather than push measures targeting individual behaviours has been well documented (see section 4.3). The preference may, however, depend on other policy characteristics, such as the targeted behaviour, trust towards the proposing body, and, among others, perceived environmental effectiveness or effect of the policy in other domains (e.g., in changing behaviours). Thus, the relationship of the two characteristics is examined in this study and the same set of independent variables is introduced into the regression models of the perception of the two policy characteristics to compare them in terms of their relationships with other factors.

4.6.2. Methods

Sample

Data were collected within the CECILIA2050 project (cecilia2050.eu) by combination of online questionnaires (CAWI) and computer assisted personal interviews (CAPI) in the Czech Republic and Poland. Online questionnaire only was used in the United Kingdom. This strategy was chosen to alleviate possible representativeness issues caused by lower internet coverage rates in the Czech Republic and Poland. Data collection took place during September and October 2015. Respondents were selected from a large private company panel to fit national quotas on gender, age by categories, regions, and education (see Table 12). The values of national quotas were attained first during the collection of the data and again in the process of data cleaning. The analysed samples are therefore representative by the set quotas for the national populations of adults between the age of 18 and 69. Data were not weighted.

Respondents participating in the self-administered online mode were checked for inattentive responses by measuring the time spent answering different sections of the questionnaire. Outlying values of time spent answering the questions were replaced by median value of a specific age group in order to compensate for respondents who interrupted the task and came back to finish the questionnaire later. Respondents who completed the questionnaire in less than 48% of the adjusted median time in groups based on age and country were filtered out from the final sample. In total, 9%, 14%, and 12% of respondents were filtered out in the Czech, Polish, and British samples respectively, yielding a total of 4,098 cases in the three countries. The basic socio-demographic characteristics of the three samples are presented in Table 12.

Table 12: Study 3 sample characteristics

		Czech Republic <i>n</i> =1581	United Kingdom <i>n</i> =1251	Poland <i>n</i> =1266
data collection method	CAPI	27.3	0	33.9
	CAWI	72.7	100	66.1
gender	female	52.3	50.8	50.7
age	18-35	38.4	35.8	37.0
	36-50	28.1	31.3	28.5
	51-69	33.5	32.9	34.4
education	primary and lower	48.7	41.4	42.4
	upper secondary	33.8	23.3	37.7
	tertiary	17.5	35.3	20.0
municipality size (nr. of inhabitants)	up to 1,000	16.4	11.2	14.0
	1,001 - 10,000	27.9	25.4	12.3
	10,001 - 100,000	32.4	34.3	33.1
	100,001 - 1 million	11.0	16.4	33.3
	more than 1 million	12.3	12.7	7.3
member in envir. NGO	yes	3.2	7.7	3.1

The development of the questionnaire was informed by semi-structured interviews conducted in the Czech Republic in 2014. The instrument was pretested in CAWI mode in the following year. It was translated to English and the translation was corrected by several translators. The same translation procedure was applied from English to Polish.

Independent variables

Independent variables include the key concepts of the VBN theory: personal value orientations (altruistic, egoistic, and biospheric; Schwartz, 1970), environmental values (revised NEP scale; Dunlap et al., 2000), awareness of consequences, personal norm, and ascription of responsibility. Based on the conclusions drawn from the literature review presented in chapter 4, two variables of ascription of responsibility were included in the analysis – ascription to oneself (individual responsibility) and to government. Moreover, trust toward international and national governmental bodies and respondents' views on the role of the state in national economies were also included. All attitude variables including awareness of consequences, ascription of responsibility, and trust were measured on Likert-type scales. The question wordings and response scales are provided in Table 13. Apart from trust and personal values, all such variables were measured on scales ranging from 1 to 7. Trust was measured on a scale from 0 to 10 (the battery was adopted from the ISSP questionnaires) and personal values were measured on a scale from -1 ('opposed to my values') through 0 ('not important') to 7 ('of supreme importance') in accordance with Schwartz's (Schwartz, 1992) measure of value orientations.

Table 13: Question wording and reliability of independent variables

Question wording			Scale	Reliability (original)			Reliability (imputed)		
			CZ	UK	PL	CZ	UK	PL	
Trust twd national governmental bodies	3 country specific items	No trust at all (0) - Complete trust (10); DK	0.92	0.95	0.93	0.92	0.95	0.93	
Trust twd international institutions	2 country specific items		0.65*	0.71*	0.69*	0.65*	0.72*	0.70*	
Value orientation:	Q: <i>Different people have different values. Please indicate on the following scale how important each of these is as a guiding principle in your life.</i>								
biospheric	Unity with nature, fitting into nature	opposed to my values (-1) not important (0)	0.87	0.91	0.89	<i>no missing values</i>			
	Respecting the earth, harmony with other species								
	Protecting the environment, preserving nature								
altruistic	A world of peace, free of war and conflict	important (3) very important (6)	0.75	0.85	0.84	<i>no missing values</i>			
	Equality, equal opportunity for all								
	Social justice, correcting injustice, care for the weak								
egoistic	Authority: the right to lead or command	of supreme importance (7)	0.64	0.76	0.70	<i>no missing values</i>			
	Influence: having an impact on people and events								
	Wealth: material possessions, money								
Awareness of consequences	<i>Global climate change will ...</i>	Unlikely (1) - Likely (7); DK	<i>formative indicator</i>						
	... cause extreme weather and more natural disasters (e.g. floods or extreme drought) in [country].								
	... be a serious problem for species of plants and animals and their natural habitats.								
	... have negative impacts on my own health and well-being.								
	... negatively affect health and living standards of people in my local region.								
	... will be in general a serious problem for me and my family.								
Ascription of responsibility: individual	My contribution to greenhouse gas emissions is negligible.	Strongly disagree (1) - Strongly agree (7); DK	0.29*	0.45*	0.32*	0.30*	0.45*	0.32*	
	In principle, individuals cannot contribute to the reduction of greenhouse gas emissions on their own.								
Ascription of responsibility: government & business	Business and industry should reduce their emissions to help to prevent climate change.		0.58*	0.68*	0.65*	0.59*	0.70*	0.66*	
	The government should take strong action to reduce emissions and prevent climate change.								
Personal norm	We have a moral obligation to future generations to do whatever we can to prevent climate change.		0.58*	0.64*	0.67*	0.59*	0.67*	0.68*	
	I feel morally obliged to bear in mind the environment and nature in my everyday behaviour.								
Environmental values ^a	15 items; see REF	0.79	0.84	0.76	0.79	0.84	0.77		
Role of the state	It is the government's responsibility to provide a job for everyone who wants one.	-	-	-	-	-	-		
	It is not the government's role to redistribute income from the better off to the worse off.	-	-	-	-	-	-		

Note: Reliability measured by Cronbach's α . Two-item measures assessed by Spearman's rho (*).

Some of the questions measuring independent variables included option “I don’t know” (DK; see Table 13), which presents a problem of missing data if the variables are to be treated as ordinal or cardinal in the statistical analyses.³² The variables were therefore checked for patterns of missing data. No such pattern was discovered, although non-response present in some items correlated with other variables. Data are thus likely missing at random (MAR) rather than completely at random (MCAR). Moreover, composing index variables from items excluding DK answers results in a considerable decrease in valid cases. Listwise deletion of incomplete cases during index construction and subsequently in the regression analyses would exclude approximately 40% of all otherwise valid observations. Hence, DK answers occurring in items of independent variables were imputed with values computed by expectation maximization method.³³ Correlational and regression analyses were then computed with both the original and the imputed data. The results of correlational analyses were equivalent, minor differences in results of regression analyses are reported in the Results section.

Dependent variables

Two evaluations of six policies were elicited from the respondents: perceived effectiveness and perceived infringement on freedom. Respondents evaluated six policy instruments separately in two batteries with randomized item order using a 7-point Likert-type scale and two additional categories: “I don’t know” and “I am not familiar with this instrument”. Effectiveness was defined as likelihood of fulfilling the goal of GHG emission reduction by 80% in 2050³⁴, while infringement on freedom was exemplified by limitations in purchasing choices, behaviour, personal choices etc.³⁵ In total, six policy instruments were presented, ranging from taxes to information campaigns (see Table 14). The selection of these instruments was based on their universal presence in the national debates and European discussions about tackling climate change (as debated and analysed within the CECILIA2050 project; Görlach, 2013).

Split sample design was adopted – randomly selected half of the respondents was presented with the instrument of taxes labelled as such, while the other was provided with the label “charges”. Since there is no statistically significant difference between the evaluations of charges and taxes (χ^2 test, $\alpha=0.05$), the two groups are analysed jointly.

Although the evaluations of different instruments are correlated (see Table 27 and Table 28 in Appendix) and have considerably high Cronbach’s α (0.840 and 0.887 respectively for effectiveness and infringement), each item is analysed separately in this study, since the objective is to explore differences in factors related to different policy instruments. DK answers were not imputed with values of the scale. Rather, differences between those who

³² No other sources of item non-response were present in the dataset.

³³ Data were imputed with values computed by expectation-maximization (EM) procedure in SPSS statistical software including most of the analysed variables and some other attitudinal variables available in the dataset (25 iterations). Data were also imputed with multiple imputation method - results obtained from this imputation were equivalent to those obtained from EM imputed dataset, hence, EM imputed values were used for the sake of simplicity of analysis (avoiding working with several multiply imputed datasets and pooling estimation results).

³⁴ Question wording: *Policy measures are effective to different degrees. If implemented, some policy measures are more likely than others to fulfil the goal of greenhouse gas emissions reduction by 80% in 2050. Please, indicate on the scale how likely it is that the following policies will succeed in reaching this goal.*

³⁵ Question wording: *Policy measures have impacts on people’s lives, behaviour and their freedom. Please indicate on the scale from 1 to 7, how much the following policy measures would infringe on your personal freedom (e.g. limiting your purchasing choices, your behaviour or habits etc.) or not.*

provided an answer on the scale and those who opted for one of the two DK answers were analysed (see the following section) and subsequently only valid cases were used in some of the analyses (multinomial logistic regression analyses).

Table 14: Missing values (%): respondents who answered *Don't know* or *Not familiar with measure*

	Czech Republic	United Kingdom	Poland	Total
<i>total N</i>	1581	1251	1266	4098
Perceived effectiveness	%	%	%	%
Technology & energy performance standards	14	22	15	17
Subsidies for energy savings	10	20	14	14
[Charges for/Taxes on] energy and emissions	12	20	16	16
Emissions trading system	19	27	26	24
Removal of environmentally harmful subsidies	15	22	19	19
Information provision	10	22	16	16
Perceived infringement	%	%	%	%
Technology & energy performance standards	17	24	17	19
Subsidies for energy savings	12	22	16	16
[Charges for/Taxes on] energy and emissions	11	22	15	15
Emissions trading system	23	29	27	26
Removal of environmentally harmful subsidies	17	25	20	20
Information provision	11	24	16	16

Analysis

Nonparametric correlations (Kendall's τ) between dependent variables and subsequently between dependent and independent variables were analysed. Dependent variables are ordinal and hence cannot be analysed by means of linear regression. The assumption of proportional odds did not hold for the ordinal regression models (tested by test of parallel lines in SPSS) and therefore two alternative approaches to transformed categorical dependent variables were chosen.

First, since items within the batteries are correlated with each other, multivariate probit regressions were used to estimate all equations together. To run a probit regression model, the dependent variable had to be recoded to two categories. For perceived effectiveness, those who thought it unlikely that the policy would attain the set goal (two extreme categories on the scale) were coded as 1 and all others (including DK values) were coded as 0. Similarly, those who thought a policy to be infringing (two extreme categories) were coded as 1 and all others as 0. The main question behind this type of analysis is what factors contribute to the formation of negative perception of the six policies with respect to the two characteristics.

Second, multinomial regression analyses were conducted with dependent variables recoded into three categories. Two points on both extremes of the scale were recoded to categories *likely* and *unlikely*, *infringing* and *not infringing* respectively for the two policy characteristics. The category of *undecided* (middle) comprised the three middle points of the original scale and served as the reference category of the multinomial regression models. This analysis aims to identify factors contributing to formation of either positive or negative policy evaluation with respect to effectiveness and coerciveness. Those, who do not have any view on the respective policies are omitted, thus, the results cannot be generalized to the whole population, but only to those, who eventually form an opinion. Moreover, separate models

were run for the multinomial regression, which may contribute to a minor bias in standard errors of the estimates. However, the results of the previous multivariate probit estimation were compared to the results of estimating separate probit regression models and the results are substantively equivalent. One can therefore expect the bias in separate multinomial regression estimations to be negligible.

All regression models were computed using the original and consequently also the imputed data. Results of computation with imputed data are presented and interpreted in the following text. There were some minor differences between the two computations, but the substantive results are uniform. Analyses were computed with SPSS v17 or v19 software and for each surveyed country separately. Multivariate probit models were computed using the package “mvprobit” in STATA v13.

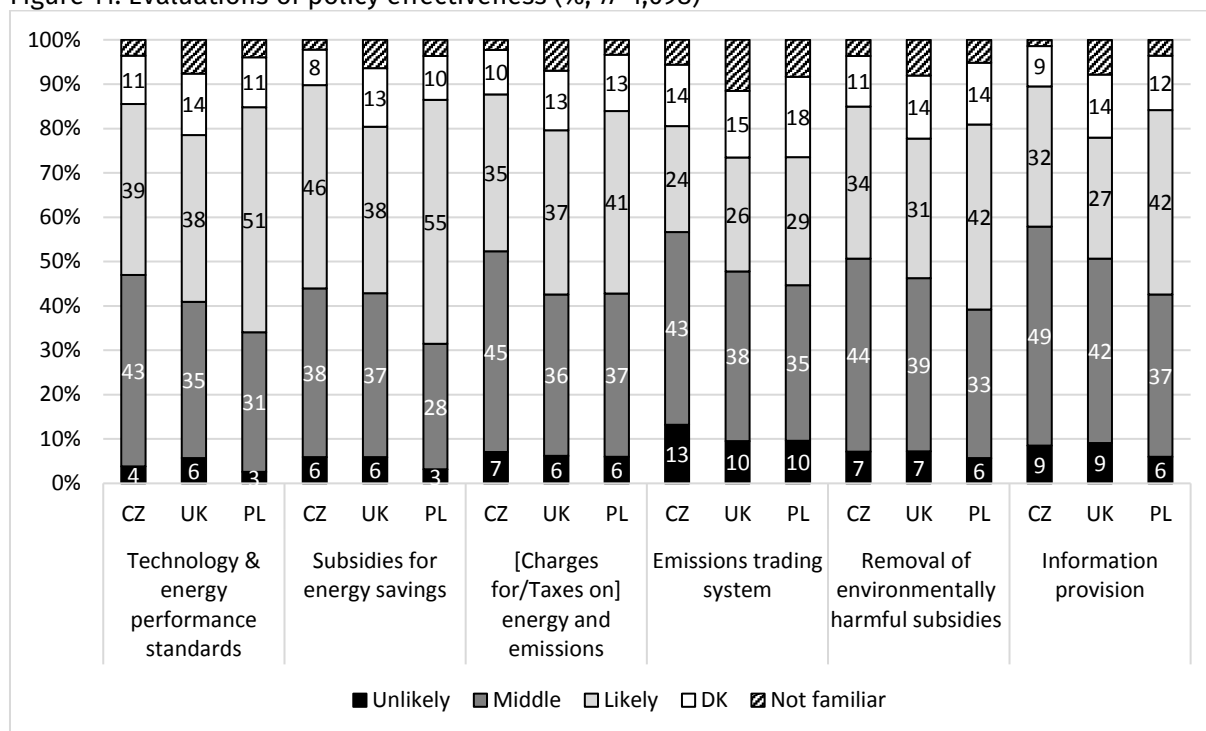
4.6.3. Results

Respondents' evaluations of the examined policy instruments as (in)effective, i.e., as (un)likely to achieve the stated goal, or as (not) infringing their freedom are presented in Figure 11 and Figure 12 respectively. Only a minority of people in the three countries regards any of these instruments as unlikely to reach the goal. For most instruments, except for the ETS and information provision as evaluated by the British, at least one third of the respondents considers these instruments as effective. Technology and energy performance standards and subsidies for energy savings are seen as effective by the largest shares of the surveyed samples.

Respondents were much more indecisive with respect to infringement on freedom. To be sure, this is not an everyday notion and might have seemed a bit too abstract to some of the respondents. Nonetheless, respondents were able to discriminate between the instruments and potential effects these instruments can have on their everyday lives and choices. As expected, information provision was most often deemed as not infringing, while taxes or charges were seen as infringing by largest shares of the respondents in all three countries.

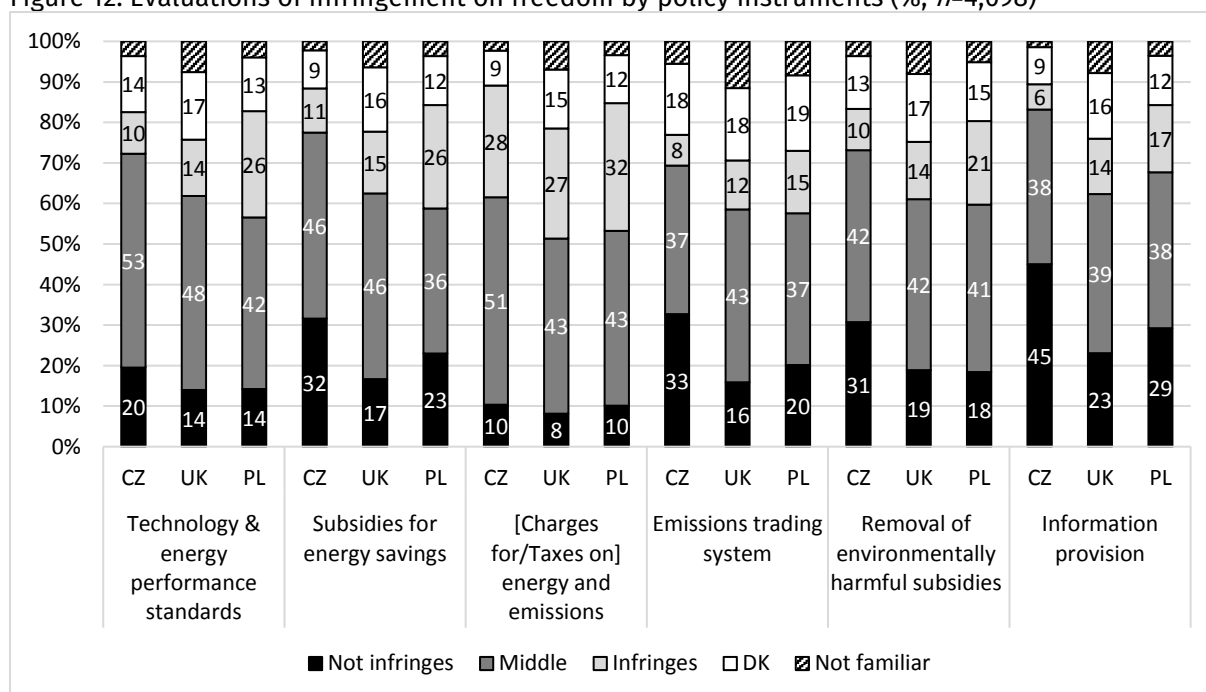
Interestingly, there is a trend to view policy instruments as less effective and less infringing in the Czech Republic compared to Poland (and to a lesser degree to the UK). This is particularly clear in the case of information provision – while a large part of the respondents from the Czech Republic clearly discriminated information provision as not infringing, respondents from the other two countries were much more cautious. On the other hand, Czech respondents also used *don't know* categories less often, which may hint to different response styles in the three countries.

Figure 11: Evaluations of policy effectiveness (%; $n=4,098$)



Question wording: Policy measures are effective to different degrees. If implemented, some policy measures are more likely than others to fulfil the goal of greenhouse gas emissions reduction by 80% in 2050. Please, indicate on the scale how likely it is that the following policies will succeed in reaching this goal.

Figure 12: Evaluations of infringement on freedom by policy instruments (%; $n=4,098$)



Question wording: Policy measures have impacts on people's lives, behaviour and their freedom. Please indicate on the scale from 1 to 7, how much the following policy measures would infringe on your personal freedom (e.g. limiting your purchasing choices, your behaviour or habits etc.) or not.

Respondents who did not know how to answer or were not familiar with the instrument at hand (see Table 14) differ from those who answered using the response scale. In all three countries, women were more likely than men to provide DK answers in both batteries. Also, those who have achieved higher levels of education are less likely to opt for a DK answer and more likely to provide an answer on the scale (see Table 23 and Table 24 in Appendix). Some differences can also be found for age categories, although the relationship is often not so straightforward and is less robust – the category of young adults on one hand and those aged 51 and more on the other tend to select DK more often than those between 36 and 50 years of age. Moreover, there are also some differences with respect to other value and attitude scales (see Table 25 and Table 26 in Appendix). In all three countries, those who provided 4 or more DK answers express on average lesser trust towards the government and are somewhat more inclined to ascribe responsibility to individuals.

As expected, the items within the two batteries of perceived policy characteristics are correlated with each other, although variation is present (see Table 27 and Table 28 in Appendix). The coefficients tend to be somewhat higher in the UK and Poland compared to the Czech Republic. Also, values of Cronbach's α of the index composed from the six battery items are lower in the Czech Republic (0.761 and 0.840 respectively for effectiveness and infringement, compared to 0.901 and 0.918 in the UK). The British respondents seem to be more consistent in their evaluations, i.e., differentiate among the instruments less often in terms of their perceived effectiveness and infringement on freedom. All respondents seem to provide more homogenous evaluations with respect to perceived infringement on freedom, which may be a consequence of the concept being more abstract and less common to lay people.

One policy instrument, however, sticks out – the correlational coefficients between perceived coerciveness of taxes or charges and of all other policy instruments are all lower than coefficients between perceived coerciveness of other instruments. Taxes are regarded as infringing most often (see Figure 12) and this evaluation necessarily does not fully correspond with evaluations of other instruments. In other words, taxes can be singled out with respect to their perceived impact on citizens' lives. In terms of perceived effectiveness, the British respondents evaluate different instruments with higher levels of consistency (Cronbach's $\alpha = 0.901$ and correlation coef. between 0.378 and 0.519) relatively to the Polish and the Czech respondents.

Interestingly, perception of effectiveness and infringement on personal freedom posed by specific policy instruments is correlated only weakly if at all (see Table 15). Most coefficients have positive values, implying that instruments perceived as effective can be also more likely perceived as infringing. Yet some coefficients measured in the Czech Republic have negative values suggesting a reverse relationship, different response style, or understanding of the survey question.

Table 15: Kendall's τ correlation coefficient for perceived effectiveness and infringement on freedom

	Czech Republic	United Kingdom	Poland
Technology & energy performance standards	-0.100**	0.071**	0.132**
<i>n</i>	1250	920	1004
Subsidies for energy savings	-0.123**	0.0116	0.039
<i>n</i>	1346	947	1033
[Charges for/Taxes on] energy and emissions	-0.050*	0.069**	0.093**
<i>n</i>	1327	946	1013
Emissions trading system	0.045	0.221**	0.185**
<i>n</i>	1145	855	865
Removal of environmentally harmful subsidies	-0.081**	0.081**	0.061*
<i>n</i>	1245	909	965
Information provision	-0.006	0.247**	0.165**
<i>n</i>	1356	920	1016

Note: Perceived effectiveness was measured on a scale from 1 (very unlikely) to 7 (very likely). Infringement on freedom was measured on a scale from 1 (not infringes at all) to 7 (infringes very much).

Models

As stated above, two approaches to analysing the perceptions of policies with respect to their effectiveness and coerciveness were taken: multivariate probit analysis of all policies within one characteristic, analysing all available data; and multinomial logistic regression analyses of single policy evaluations excluding those who answered they do not know or are not familiar with given policy instrument (*don't know*, DK).

Both approaches lead to different interpretations. While probit models allow us to analyse what contributes to formation of negative perceptions in whole populations, MNL regressions allow us to compare factors contributing to both positive and negative perceptions as compared to the middle position as a reference category. MNL regressions are univariate, therefore regression equations were computed separately for each policy. This could have led to a bias in standard errors of the estimates. Nonetheless, as is apparent from tables from Table 17 to Table 20, the results of probit and MNL estimations are very close and the differences likely correspond to the inclusion of DKs into analysis. Some variables are more often statistically significant in the probit models. These differences are commented on below. The similarity of the results lends support to feasibility of use and interpretation of separate MNL regression models with the bias in estimated results to be negligible with respect to the overall goal and purpose of the analyses.

Yet, the performance of all computed MNL models is low. Nagelkerke R^2 s were in all cases lower than 0.4 and the highest percentage of cases correctly sorted to the three categories of the dependent variables was 70% (see Table 16). Given that the *undecided* group was in most models the largest one, the models struggled mostly with identifying cases in the other two groups. Low efficiency of the model suggests other variables are of greater importance than those currently included in the model.

These results could be also suggestive of the arbitrary nature of respondents' evaluations. Yet, respondents differentiated between policy instruments, which lends support to the assumption that they decide with a certain degree of reflection and consideration, although perhaps with consideration of other reasons and arguments than those examined here. Interestingly, the model had better fit in general in the UK than in the Czech Republic or

Poland, which may be related to the specific historical, political, and social context of these post-communist countries. Despite the low efficacy of the model, the results obtained from its application to various policy instruments are informative about differences and commonalities in policy evaluation.

Table 16: MNL model performance (Nagelkerke R^2 , overall % of cases correctly predicted by the model)

Perceived effectiveness									
CZ				EN			PL		
	<i>n</i>	Nagelk. <i>R</i>	% predicted	<i>n</i>	Nagelk. <i>R</i>	% predicted	<i>n</i>	Nagelk. <i>R</i>	% predicted
Technology & energy performance standards	1210	0.208	63%	901	0.325	63%	889	0.303	66%
Subsidies for energy savings	1268	0.166	59%	926	0.280	63%	908	0.277	70%
[Charges for/Taxes on] energy and emissions	1241	0.152	58%	917	0.283	62%	886	0.267	63%
Emissions trading system	1146	0.120	57%	848	0.336	65%	792	0.191	54%
Removal of environmentally harmful subsidies	1208	0.127	58%	895	0.299	63%	852	0.217	63%
Information provision	1266	0.120	58%	896	0.341	65%	884	0.264	64%
Perceived infringement									
	<i>n</i>	Nagelk. <i>R</i>	% predicted	<i>n</i>	Nagelk. <i>R</i>	% predicted	<i>n</i>	Nagelk. <i>R</i>	% predicted
Technology & energy performance standards	1177	0.090	64%	874	0.250	67%	875	0.157	56%
Subsidies for energy savings	1247	0.140	55%	894	0.253	64%	889	0.197	54%
[Charges for/Taxes on] energy and emissions	1264	0.074	59%	902	0.182	61%	904	0.083	55%
Emissions trading system	1095	0.152	57%	811	0.320	64%	777	0.161	57%
Removal of environmentally harmful subsidies	1183	0.176	56%	869	0.280	63%	850	0.169	56%
Information provision	1267	0.147	61%	876	0.324	58%	887	0.257	57%

Perceived effectiveness

MNL regression

In the MNL regression, perceived effectiveness (for simplified overview of the results, see Table 18; for detailed results see tables from Table 31 to Table 33 in the Appendix to this study) is universally across states and instruments (with few exceptions) positively related to ascribing responsibility for climate change action to the government. The causality could run both ways – if the policy proposed by the government was seen as effective, the state would be responsible to undertake such action; if the government was responsible, its actions would better be effective. One could also argue that there is a more complex interdependency

of these two beliefs than simple linear causality involving other considerations such as one's own perceived responsibility (see below).

Except of assigning responsibility to the state, there is no other factor common to all instruments across the three national samples. Statistically significant effects show a great variability, likely mirroring different country-specific situations and concerns and instrument-specific considerations, as well as the number of variables in the model (some ought to be significant). For example, altruistic value orientation has a direct statistically significant positive effect resulting in odds evaluating policy as effective being higher than odds of respondents to be undecided (in the middle group) in all countries in the case of subsidies, while biospheric value orientation has a similar effect in the case of information provision. These are instrument-specific effects occurring across the three countries.

On the other hand, odds ratios in favour of evaluation as *likely* related to trust toward government and awareness of consequences seem to be country-specific for the UK, where these two effects are statistically significant for all instruments (except for awareness of consequences for subsidies). Interestingly, awareness of consequences is related to odds of evaluating policy as *unlikely* to achieve its goals being lower than odds being *undecided* in Poland. Therefore, while in the UK awareness of consequences is related to policy being evaluated as effective, in Poland it is more often related to policy not being evaluated as ineffective. In short, in one country the variable can have a greater effect among those who are not convinced at all while in other country among those who regard the policy to be effective.

Other variables have similarly diverging statistical effects. Since the reference group is the middle category, a consistent relationship between independent and dependent variable would manifest as a positive effect in one category and negative in the other (e.g., in Poland, ascription of responsibility to the state and for some policies also awareness of consequences have these effects). Yet, most independent variables have a statistically significant effect in only one category. For example, trust toward international governance bodies is related to lower odds of evaluating policy as *unlikely* to achieve its goals compared to odds of being *undecided* on several occasions (particularly in the UK and the Czech Republic for performance standards and the ETS), while there is no statistically significant effect on evaluating the instruments as *likely* to achieve the set goals. This suggests that trust toward international institutions could be an important factor related to the perception of instrument as ineffective, but not so much to its perception as effective.

Interestingly, NEP and biospheric value orientation are related to perception of some instruments as effective and of other instruments as ineffective. For example, for subsidies and taxes in the UK the odds of perceiving policy as ineffective are higher than odds of perceiving it as somewhat effective in response to increase in biospheric value orientation, while the odds of perceiving information provision as effective are higher than odds of perceiving it as somewhat effective in response to the same variable; meaning that this variable has different relationships with perceived effectiveness of different policy instruments. Thus, the British with biospheric value orientation tend to consider taxes and subsidies as ineffective on one hand and information provision as effective on the other. This result furthermore supports the idea of value-based instrument-specific policy evaluations and preferences.

Table 17: Multinomial logistic regression results: perceived effectiveness of climate policy instruments (imputed data)

		Czech Republic						United Kingdom						Poland					
		A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Unlikely	Const.					-											---		
	Age							+++	+++	+++	+++								
	Income		++					++											+
	Altruistic										+++							++	
	Biospheric								++	++			+						
	Egoistic							---			-		---						
	NEP			+	+						++				++		++		
	AC			---								---	-	---	-	---	--	-	--
	Trust G		--	---			-		--							--			
	Trust Int	--			---	---	-	--	-	--	---	-	---						---
	ARI						++									++	+++		++
	ARS						--						-	---	--	---	--	--	-
	PN		---					---	---	---	---	---	-				+		
	State1	++			-	++										-			
	State2								--							+	--		
	Male=0 (ref)																		
	Male=1		--	--	---														
	Education primary (ref)																		
	Education lower sec		--				+										--		
	Education upper secondary															--	---		
	Education tertiary															--	---	-	
Likely	Const.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Age										-								
	Income	+		+++				++								+	+		
	Altruistic	+++				+++		++						+++	++	++			++
	Biospheric	++			++		+++						++						++
	Egoistic																		
	NEP	+++	++			+							--						
	AC		+	+	++			+++		+++	+++	+++	+++	+		+++	+++	+	++
	Trust G							++	++	+++	+++	++	+++				++		++
	Trust Int			+															
	ARI				++					++	++	++	+					+++	
	ARS	+++	+	+++	++	++	++	++	+++		+		+++	+++	+++	++		++	+++
	PN					+		+		+		++		+					
	State1	-			-			+		+	+++		+++				+		
	State2					++							++			++		++	
	Male=0 (ref)																		
	Male=1	---	---											-					
	Education primary (ref)																		
	Education low	+			--						-								
	Education up	++					-										-		
	Education tertiary												-			--			
n		1210	1268	1241	1146	1208	1266	901	926	917	848	895	896	889	908	886	792	852	884
Nagelkerke		0,208	0,166	0,152	0,120	0,127	0,120	0,325	0,280	0,283	0,336	0,299	0,341	0,303	0,277	0,267	0,191	0,217	0,264

Note: **A** - Technology & energy performance standards / **B** - Subsidies for energy savings / **C** - [Charges for/Taxes on] energy and emissions / **D** - Emissions trading system / **E** - Removal of environmentally harmful subsidies / **F** - Information provision

Multivariate probit

Results of the multivariate analysis are very similar to those yielded by MNL regression. Nevertheless, the effects of some variables are statistically significant for more policies. For example, environmental values measured by the NEP scale tend to have statistically significant relationships with evaluation of information provision policy as unlikely to achieve its goals, similar to ETS. Interestingly, awareness of consequences has statistically significant negative coefficients for most of the policies in the UK and Poland (not so in the Czech Republic), which would suggest that those who form negative evaluation of policy effectiveness tend to be less aware of climate change consequences than not only those who

form more positive evaluation, but also those who do not form any (DKs). Otherwise, the results show a great variability in terms of country-specific and policy-specific effects as well.

Table 18: Multivariate probit results: perceived effectiveness of climate policy instruments (imputed data)

	Czech Republic (n=1403)						United Kingdom (n=1129)						Poland (n=1037)					
	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Const.					-	-								-		---		
Age								++	+++	+++	++							
Income		+					++					+						
Altruistic	--									+++	++						++	
Biospheric							+	+++	+++			++						
Egoistic			-				---		-	---		---				--		-
NEP			+	++		+				+++	++	+++		++		++		++
AC			---	--		-	--		--	--	---	---	---		---	--	--	---
Trust G		---	--			-		--							---			
Trust Int	--			--					-			-						--
ARI						+									+	++		++
ARS	--		--	-	-	---						--	---	---	---	--	--	--
PN		---					---	--	---	---	---	-						
State1	++			--						---		--		-	---			
State2								--		--		-	--		+	--		
Male=0 (ref)																		
Male=1		-	---	---						--								
Education primary (ref)																		
Education lower secondary									-									
Education upper secondary																		
Education tertiary		-				++												
Wald	238,0						293,9						240,0					
Log lik	-1810,0						-1075,9						-972,2					

Note: **A** - Technology & energy performance standards / **B** - Subsidies for energy savings / **C** - [Charges for/Taxes on] energy and emissions / **D** - Emissions trading system / **E** - Removal of environmentally harmful subsidies / **F** - Information provision

Perceived infringement on freedom

MNL regression

Similar to perceived effectiveness, there is only one factor related to perceived coerciveness common across countries and policy instruments. Compared to policy effectiveness, it is not ascription of responsibility, but environmental value orientation measured by the NEP scale. Higher values on the scale are related to perception of instruments as not infringing except for perception of taxes in the Czech Republic and Poland (see below).

Again, there is a great diversity in the results across countries and instruments with respect to factors related to perceived coerciveness. There are only few apparent patterns, including the statistically significant coefficients of ascription of responsibility to the individual, which is almost unique to the UK. With higher agreement with the statement that individuals are responsible for tackling climate change the odds that the instrument will be seen as infringing are higher than odds of evaluating it within the three middle categories (general views on the government's responsibilities in welfare and social state show a similar pattern, also unique to the UK). It would hence seem that where ascription of responsibility plays a role, ascribing responsibility to diverse actors can have different effects on perception of different policy characteristics. As has been already pointed out, ascribing responsibility to the state is related to higher perceived effectiveness (and in only few instances to higher perceived infringement), while ascribing it to individual citizens is often related to higher perceived infringement (see Table 19). Hart (2011) found a relationship between ascription of responsibility to the individual and environmentally-significant behaviours and a relationship between ascription to the state and policy attitudes. The two "ascriptions" are

not necessarily mutually exclusive, although citizens may prefer one over the other. Rather, it is a matter of scale – how much responsibility do people assign to themselves and how much to the government.

Table 19: Multinomial logistic regression analysis results: perceived coerciveness of climate policy instruments (imputed data)

		Czech Republic						United Kingdom						Poland					
		A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Not Infringes	Const.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Age														---				---
	Income		++					+	++	+									---
	Altruistic		+				++		+++	++		++	+++		++				+++
	Biosph	-											---						
	Egoistic								---	---	---	---	---						---
	NEP	+++	+++	+	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+	+++	+++	+++
	AC	--	-		--	--	---	-	-	--		---	---						
	Trust G					--	-							--			-	---	
	Trust Int	-		--															-
	ARI		-				-		+++								++		
	ARS	+++	+		+		+												
	PN		++											+	++		++	+	
	State1	--			---	-		--			---		---		--				
	State2				-						---		--		-		--		
	Male=0 (ref)																		
	Male=1		---				--			--				-					
	Education primary (ref)																		
	Education lower secondary					+++	+++							--	-				
	Education upper secondary					++	++							---	--		---	--	--
	Education tertiary													--	--		---		-
Infringes	Const.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Age		++			+++			++	+++		+++				++	--		
	Income		+				++												
	Altruistic			++															---
	Biospheric	+	-		+++	+++	++				+++	+	+		++		++	++	+++
	Egoistic							++		+++									+
	NEP			++					--			--							--
	AC							+++			+++	+	++	+					
	Trust G			--				+	+		++		++						+
	Trust Int													+					---
	ARI			+++		+		+++	+	+++	+++	++	+++	++	+++	+	++	++	
	ARS				++	++					--				+				+
	PN	--	--	-		---								+				+	
	State1				++	++		+++	++	+	++	++	+++	+++		+++	+++		+++
	State2							++	+++	++	+++	+++	+++						
	Male=0 (ref)																		
	Male=1																		
	Education primary (ref)																		
	Education lower secondary								--										
	Education upper secondary										-								-
	Education tertiary								--			-							
n		1177	1247	1264	1095	1183	1267	874	894	902	811	869	876	875	889	904	777	850	887
Nagelkerke		0,090	0,140	0,074	0,152	0,176	0,147	0,250	0,253	0,182	0,320	0,280	0,324	0,157	0,197	0,083	0,161	0,169	0,257

Note: **A** - Technology & energy performance standards / **B** - Subsidies for energy savings / **C** - [Charges for/Taxes on] energy and emissions / **D** - Emissions trading system / **E** - Removal of environmentally harmful subsidies / **F** - Information provision

Multivariate probit

Again, the results of the multivariate probit estimation are very similar to the results of MNL regression analyses. Interestingly, environmental and biospheric values have opposing effects on evaluation of infringement of some policies in Poland and the UK. While with biospheric value orientations these instruments are more likely to be seen as infringing, with higher scores on the NEP scale, they are less likely to be seen as infringing (subsidies for energy savings, ETS, removal of environmentally harmful incentives, and information

provision). This difference could be related to diverting ideas of how the environment should be protected.

There is also an interesting effect of ascription of responsibility to the individual. Polish and British respondents who ascribe responsibility to individuals are more likely to see the policy as infringing than those who see it differently or do not have any opinion at all.

Table 20: Multivariate probit regression analysis results: perceived coerciveness of climate policy instruments (imputed data)

	Czech Republic (n=1403)						United Kingdom (n=1129)						Poland (n=1037)					
	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Const.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Age		++			+++			++	+++		+++				++	--	---	
Income																		
Altruistic			+	-		--				-							--	---
Biospheric				+++	+++	++	+	++	++	+++	+++	+++				+++	++	+++
Egoistic							+++	+	+++		++			+				+++
NEP			+			--		---		--	---	-	---	--		---	---	---
AC		++			+		+++			+++	++	++						
Trust G			-				+	++		++		+++				+		+
Trust Int													++					
ARI			++				++		+++	+++	+	++		+				
ARS				+	++		-			--		-		+			+	
PN	-	--		-	---								+					+
State1				+++	++		+++	+++	+	+++	++	+++	+++	+	+++	+++		+++
State2		++					++	+++	++	+++	++	+++						
Male=0 (ref)																		
Male=1	-		-	--	--													
Education primary (ref)																		
Education lower seconda		++						-										
Education upper	-					-	+				+							
Education tertiary	-																	
Wald	185,7						352,6						209,6					
Log lik	-2479,0						-2017,1						-2746,1					

Note: **A** - Technology & energy performance standards / **B** - Subsidies for energy savings / **C** - [Charges for/Taxes on] energy and emissions / **D** - Emissions trading system / **E** - Removal of environmentally harmful subsidies
Information provision

Case: taxes and charges

Since taxes are the most commonly discussed climate change policy instrument and factors related to their acceptability were already reviewed in this text, they are also taken as a case study in this analysis.

Perceived effectiveness of taxes or charges for high emitting behaviours is positively related to ascription of responsibility to the state in the Czech Republic and Poland (stat. sig. on 0.1 in the UK) and to the individual in the UK, while it is also negatively related to the latter in Poland (odds of finding the policy as *unlikely* to achieve the set goals are higher than odds of being *undecided* in response to ascription of responsibility to individuals). In the UK, trust towards the government has a statistically significant positive effect within the evaluation as effective, but not as ineffective. In the Czech Republic and Poland, there is a negative effect in the latter group, but not the former, suggesting that trust towards government plays more important role in relation to perceived ineffectiveness in Poland and the Czech Republic and perceived effectiveness in the UK.

In Poland, no measured variable with the exceptions of agreement with the statement that the government is not responsible for providing job to anybody who wants one, age (positive on *infringes*; sig. < 0.05), NEP (positive on *not infringes*; sig. < 0.1), and ascription of responsibility to individual (positive on *infringes*; sig. < 0.1) has a statistically significant effect on perceived coerciveness of taxes. In the UK and the Czech Republic, several, mostly attitudinal, variables are related to it. Interestingly, egoistic value orientation is related to the

perception of taxes as infringing or somewhat infringing in the UK, while NEP and altruistic value orientation are related to taxes being regarded as not infringing. On the other hand, there is an opposite effect of altruistic value orientation and NEP in the Czech Republic – those with these value orientations incline to see taxes as infringing. This can probably be related to the liberal and individualistic orientation of the Czech greens and the Green Party, which is currently politically marginal, but was established leaning to the right side of the political spectrum. Interestingly, NEP has also a statistically significant (sig. < 0.1) positive effect on perception of taxes as not coercive, which is contradictory to the positive effect on perception of taxes as coercive. Hence, this value orientation may contribute to opposing policy evaluations. This illustrates the point made earlier in this text in the literature review – although environmental orientation may be a strong factor in policy attitudes, it can be overruled by other considerations, such as ascription of the responsibility to the individual and distrust toward the government, both flagged as statistically significant in this case. Individuals with strong environmental values may also hold liberal values which are given priority in such policy decisions.

4.6.4. Conclusions

It is hardly surprising, given the low correlations between perceived effectiveness and coerciveness of different policy instruments, that the perception of these two policy characteristics is related to different variables and hence likely stems from differing considerations. There are only two factors common to all instruments, namely awareness of consequences for perceived effectiveness and environmental values for perceived coerciveness. Hence, while perceived effectiveness is mainly judged in relation to one's own ideas about climate change, perceived coerciveness seems to be more value based. Other than that, the results are very diverse, both country and instrument specific.

In terms of the model, its overall performance is weak, suggesting that other, so far omitted, variables may explain more variability of respondents' evaluations or that their evaluations are decided arbitrarily. The latter conclusion is, however, contradicted by the simultaneous existence of factors common to all policy instruments in both evaluations and the instrument-dependent diversity of other factors suggesting that citizens can differentiate between climate change policy instruments. Perception of policy characteristics is therefore not likely to fit into the VBN theory model as a set of mediating variables, at least not universally. The diversity of the few existing models described in section 4.1 of this text thus merely reflects reality.

As a limitation which may increase the diversity and lower the comparability of the results, the problem of equivalence of attitude scales used in this study should be considered. Most cross-national comparative studies (see Anýžová, 2015 for a study of ESS - European Social Survey) suffer from low or insufficient equivalence of used measures. Equivalence is rarely assessed and therefore the problems can go unnoticed and the differences in the results are interpreted as differences in values and attitudes rather than differences in meaning or understanding of the questions asked by the researches (see for example Mayerl, 2016 for analysis of equivalence of environmental concern). Although the questionnaire in this study has been translated carefully from Czech to English and from English and Czech to Polish and revised several times, even careful translation cannot ensure equivalence. This often renders aggregation on the EU level problematic.

Based on the principle of parsimony applied in the practice of model development, the next step would be to omit variables which are not statistically significant and, if data allow, find other possibly relevant variables which might be tested and eventually added to the model based on hypotheses about the nature of respondents' attitudes. With a look at the results in the three countries and for the different instruments, it would be almost impossible to find a variable that is universally not statistically or substantively significant, so it would seem like the best approach to develop each application of the model individually in order to maintain valuable information about what drives policy-specific beliefs for specific policies.

The aim of this study was to draw attention to the diversity of factors and relationships between perceived policy characteristics and other social-psychological and personal characteristics of citizens, which is currently overlooked. In face of such diversity, the goals to reach generalised results or, more importantly, to synthesise such diverse results should not be abandoned. Although it presents difficulties and requires a more detailed and hence a more demanding approach, if the goal is to formulate recommendations or to better understand how people form their attitudes, such approach should be undertaken. It would also allow more precise and hopefully more effective advice in policy formulation and communication.

4.7. Summary

The aim of the present review was to understand policy attitudes in two perspectives – as a general evaluative tendency toward climate policies and as policy-specific evaluations. The results summarized in this review further support the conclusions from the previous chapter on the nature of policy attitudes as a general evaluative tendency toward governmental climate change action. This general tendency, however, is translated in policy- and instrument-specific responses in a complex manner involving a broad variety of variables gaining substantive significance in dependence on the policy-specific context and characteristics.

A considerable diversity exists in factors related to policy-specific attitudes even within narrowly defined areas like taxes as a specific instrument of climate change mitigation policy. This diversity stems from the practice of research but also from the dependency of policy attitudes on policy-specific formulation and context. Nevertheless, some factors have been identified as common to the general climate policy evaluations and policy-specific attitudes toward taxes. Not surprisingly, these results correspond to the results presented by Drews and van der Bergh in 2015, furthermore supporting the commonality of these factors.

Only some of the common socio-economic and demographic characteristics seem to have a steady relationship in terms of its orientation (not necessarily strength), namely education and car ownership or use. The evidence on associations of general climate policy attitudes and attitudes toward taxes to gender, age, and income is mixed at best.

Environmental, egalitarian, and self-transcending value orientations are among the most robust predictors of positive public responses to climate change mitigation policies. Moreover, both general and specific policy evaluations seem to be steadily anchored in environmental values. In general, policy attitudes are formed by reference to broad values and respondents' beliefs rather than by careful deliberation of costs and benefits of climate actions. But although Drews and van der Bergh (2015) conclude that hierarchical and individualistic orientations have the opposite effect to environmental and self-transcending value orientations, the results regarding these orientations are not so robust. Rather, effects of these variables seem to depend on policy-specific principles and instruments in question. Individualistic and egalitarian worldviews within the framework of cultural theory are opposing principles leading almost universally to lower and higher levels of acceptability respectively. Fatalist and hierarchist worldviews, on the other hand, are presumably more sensitive to policy-specific context.

Political orientation usually interacts with other factors, especially policy-specific beliefs. Most of these interactions have not yet been studied. In general, left-wing and green political orientations usually imply higher probability of positive attitudes toward climate change mitigation policies. Political orientation can be a discourse gateway of policy perception and evaluation – policies are evaluated in terms of the relevant party or political ideology discourse.

Awareness of climate change consequences is also usually associated with more positive policy evaluations. Interestingly, more distant threats and threats to others rather than individuals themselves often contribute more to formation of positive attitudes. Distant effects of climate change can therefore be highly relevant, while proximising climate change can have adverse effects related to negative emotional responses – although worry has been identified as a strong factor related to policy acceptability, fear was not. Fear can have adverse effects as despair and resignation. As Drews and van der Bergh (2015) summarize, hope and

interest are also important emotions and should be addressed in climate change communication. Anticipated emotions related to one's actions, including voting behaviour, play also an important role in relation to social norms.

Descriptive social norms regarding public opinion and opinions of significant others can also contribute to positive policy evaluation, since public opinion usually is, in general, positively inclined to climate action (although public can evaluate more specific actions less positively than general policy proposals). Social norms concerning targeted behaviours can play an important role too, as well as beliefs about whether these behaviours should or should not be regulated in society and whose responsibility it is to tackle climate change or regulate individual behaviour for that purpose. Issues of trust enter the consideration then, especially toward the government and its officials.

The targeted behaviour is also important in relation to the cost of the behavioural change proposed by the policy and to the perceived effectiveness of the policy (in terms of behavioural change). With higher behavioural effort and financial costs involved, policy acceptability decreases. Just stating there will be any financial costs for the respondent can lead to a significant decrease in policy acceptability. Coerciveness in terms of costs to citizens and required behavioural efforts, as well as other constraints and limitations of personal choices and freedom, can have substantive adverse effects on policy attitudes. Pull measures are therefore universally preferred in most policy domains.

Perceived environmental effectiveness and effectiveness in reaching the proposed goals (including behavioural change) are important to positive policy evaluations. Other effects, however, may be more important to voters than environmental effectiveness. Therefore, exploring the reasons for what citizens see as effective and why is another important task for future research. Moreover, perceived effectiveness is related to perceived fairness as another key policy characteristic. Although there is no single preferred rule for distribution of costs (and benefits such as revenues) of the policy, some formulations of the polluter-pays principle are usually evaluated more positively. The role of perceptions of the policy formulation processes and their fairness, transparency, and legitimacy should be also studied in future.

Furthermore, policy effectiveness can be enhanced by revenue recycling, especially when paired with policies with less obvious effects on behaviours (e.g., taxes). Policy transparency and intelligibility, as well as trust toward politicians and government, can be crucial in policy formulation. Well-formulated policy, i.e., simple and transparent policy with clear communication of its effects, can overcome some barriers of mistrust, be perceived as more legitimate, and result in an increase in policy acceptability with relatively little costs.

Clearly, policy-specific beliefs are crucial in understanding policy attitudes. Yet, many of them are entirely omitted from analyses and those analysed do not have a stable place in any of the theoretical frameworks used in the field of public responses to environmental policies. Not many studies explore the determinants of policy-specific beliefs or whether these beliefs mediate the effects of other relevant concepts and considerations (see Study 3). Some propositions of models including policy-specific beliefs (namely perceived effectiveness, fairness, and coerciveness) summarized in this chapter have already been made and empirically tested. These models successfully depart from the VBN theory model, but differ in the proposed relationships between policy-specific beliefs, policy attitudes, and other key concepts of the VBN model. Moreover, they omit some of the key variables as overviewed in this chapter. Therefore, a framework reflecting these variables and informed by this extensive literature review and presented empirical results is proposed in the following chapter.

5. Assessment of public responses to climate change mitigation policies

More than twenty years ago, Stern (1992, p. 279) commented on the state of measurement of environmental attitudes in social research as an “anarchy”. In some ways, despite great efforts to systematize the ways we explore and measure environmental attitudes, “anarchy” prevails. The multitude of measures used to tap policy attitudes can be, for sure, fruitful, if only the results would be in some way comparable using basic criteria. Because of the absence of these basic criteria, such comparisons are difficult thus far.

As shown in previous chapters, most studies in the field do not provide any definitions of used concepts and measures and do not consider how these measures were operationalised with respect to the existing theories of the nature and structure of attitudes. Most existing measures are used as if they measured the same thing as a matter of course. There is, however, no guarantee or evidence for that. On the contrary, indications of substantial differences in different measures started to appear recently.

Dupuis and Biesbroek (2013, p. 1476) draw attention to the dependent variable problem, which “refers to the indistinctness of the phenomenon that is being measured and the fuzziness of its scope and boundaries, which leads to contradictory results and difficult comparisons between studies”. Although they refer to a policy as analysed in comparative and historical political studies, the same concern is relevant in the field of policy attitudes. Answers provided by respondents turn out to be highly context-dependent in some cases, furthermore questioning comparability of existing results and validity of some measures. Especially generally formulated measures lack potentially influential context or information important for respondents’ decision making in their lack of specification. If the goal is to assess the potential of the public to accept or positively respond to environmental policies, results obtained by general measures can easily overestimate (or underestimate) the aggregate response of the public.

The methodological, as well as theoretical, diversity reduces the ability of researchers to reach universal or generalised conclusions which would not be too simplistic. Blake (1999) for example warns against too general or falsely generalised results (or appeals about possible solutions derived from these results) used in policy design and policy making. Generalising measurement and results leads researchers to conclusions that seemingly apply to all climate policies, although important differences exist.

Moreover, generalised results create stereotypes and contribute to existing stalemates rather than to overcoming barriers. As an illustration, recall political orientation and its effect on policy attitudes in a study by Stoutenborough, Bromley-Trujillo, and Vedlitz (2014) conducted in the US, where the debate about climate policy is heavily politically polarized. The generalised measurement would lead to a conclusion that Republicans are opposed to climate policy in general. Yet, no statistically significant differences were found for Republicans and Democrats in attitudes toward market incentives, renewable energy, and increased fuel efficiency. All these instruments were evaluated positively by a broad majority of public irrespective of political orientation. Stoutenborough and colleagues (2014, p. 577) concluded their study into policy-specific attitudes and their formation by a strong recommendation: “it may be imprudent to conclude that certain demographic groups or holders of specific attitudes are more, or less, likely to support certain policy domains given the inconsistency in support for specific policies. [...] These differences could dramatically

change the way in which policy makers and interested parties pursue policy change if they had more accurate information from which to draw these interpretations”.

In response to this state, the following chapter aims to provide heuristical tools with the purpose of systematizing researchers’ decision making about measurement of policy attitudes in relation to their research goals and problems. Based on the findings and conclusions debated throughout this text, specifically on the concept of policy attitudes as introduced in chapter 3, and from the results of the literature review as presented in chapter 4, several key propositions regarding climate policy attitudes can be made:

- a) Policy attitudes are psychological tendencies expressed by a diversity of evaluative responses to specific and general policies and policy proposals.
- b) Responses to climate change mitigation policies tap into a general underlying attitude toward climate change action. This, together with bases in individual value orientations, results in their relative stability.
- c) Individual policy responses are context-, response- and policy-dependent. As such, they vary and may occasionally contradict each other and the general evaluative tendency underlying them.
- d) Some factors, such as environmental values, political orientation, and attitudes toward public governance, form the general basis of policy attitudes as psychological tendencies.
- e) Individual policy responses are furthermore based on a changing set of other values, worldviews, beliefs, and considerations. This set is a function of the type and specification of the response, the specification of a policy as entity being evaluated, and the context of the evaluation.

Put together and linked to the factors discussed in chapter 4 as key and common to most policy responses, these propositions can be depicted as a basic framework for assessment of public policy responses (see Figure 13). Such framework, however, is not a theoretical model. Rather, it is a heuristical tool for conceptualising, exploring, and measurement of policy responses (Jackson, 2005). Its purpose is to guide researchers when considering **what** to measure, **how** to define it and measure it, and **with relation to what** to analyse it. The framework may serve as a starting point for development of a more sophisticated theoretical model to be empirically tested or as a point of comparison between existing and/or future models.

The ambition to propose a comprehensive and overarching theoretical model of policy attitudes that would serve to test empirically the relationships between different factors and policy attitudes and their strength is abandoned here for several reasons. First, given the variability of policies as attitude objects and the resulting diversity in factors related to their evaluations (see Study 3), any such model would either impinge on the limits of sensible parsimony in order to encompass all possible factors, or be too general, become too simplistic, and would reduce or limit our knowledge and further exploration of policy responses and attitudes. Hence, context-based research and modelling is argued here to be a better approach (Hargreaves, 2012; Pawson, Greenhalgh, Harvey, & Walshe, 2005).

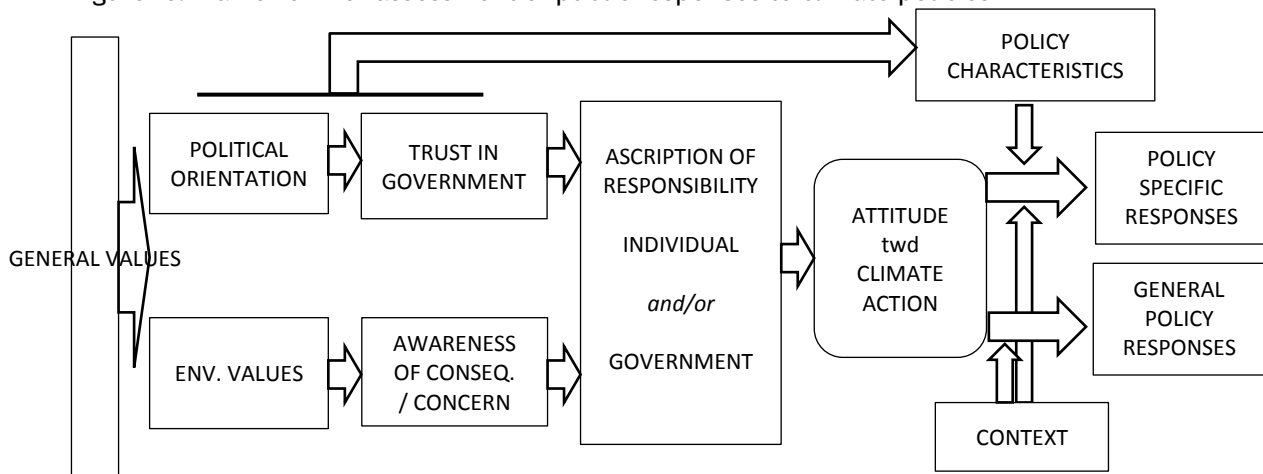
Second, plurality of models is beneficial to some degree and should not be casted aside. One single model that would define and settle the definition of the problem and then be replicated in most of the studies with varying success would likely limit us to one research problem definition and perspective. Shove (2011, p. 263) posits that “repeated calls for interdisciplinarity indicate a desire for single narratives and simple one-dimensional story

lines that explain behaviour and specify what should be done to change it”. Contrasting paradigms, however, produce distinct definitions of problems (not always congruent with definitions used by policy makers), which is what researchers should also explore (Shove, 2010a).

Moreover, empirically testing causal claims with no regard to policy-specific context can pose “the risk of making faulty causal inferences” (Falleti & Lynch, 2009, p. 2). Generalised models are reducing and omitting information which can be particularly important for a given dependent variable and its policy context.

On the other hand, we should avoid the pitfalls of *ad hoc* explorations through unsystematic application of variables, definitions, perspectives, and measurement strategies. With that in mind, the proposed framework summarizes common and general factors and groups of variables (e.g., policy characteristics), but invites researchers to specify and contextualise the proposed factors and relationships, as well as add others that proved to be influential in some instances and not others.

Figure 13: Framework for assessment of public responses to climate policies



Before dealing with factors related to public responses to climate change mitigation policies, however, attention should be paid to the definition of the dependent variable. Stemming from the propositions summarized above, there are two basic characteristics of measures of policy responses that need to be thought about carefully when designing survey questions: the psychological entity or object that is being evaluated and the type of evaluative response that is being measured. These two basic characteristics and the criteria to define and specify them are essential for increasing comparability and validity of obtained results.

5.1. Evaluative responses to climate policies

Policy responses can be measured in four distinct ways:

- 1) multiple-policy or policy-general, multiple-response measures examining several responses to several different policies or to a general policy proposal;
- 2) multiple-policy or policy-general, single-response measures focusing on one specific type or class of responses to several policies or to a general policy proposal;
- 3) single-policy, multi-response measures evaluating several different responses to a specific policy proposal or instrument; and
- 4) single-policy, single-response measures of a specific response to a specific policy formulation (based on Dunlap & Jones, 2001).

Each of these four categories corresponds to a typical research question or research problem behind it and leads to a different kind of results. As stated before, although the field is diverse in approaches and ways of measurement, it is not diverse in ways of thinking about the problem at hand. As shown in this dissertation, despite the variety of measures used in the field of public responses to climate policies, only a handful of responses gets attention, while others, no less interesting ones, are entirely omitted (see also Batel et al., 2013 in a related field). Such limitation of the research scope is presumably a consequence of the origins of our research questions in the policy-making domain. Very often, the key question is “How to formulate feasible policies?”, where feasibility is partly derived from public acceptability of the policy. Such question corresponds with measures focusing on a single policy and, most often, a single response to it (frequently *acceptability* or *support*).

If one asks, however, how would the public respond to a policy proposal, researchers would have to assess more than one evaluative response. As discussed in chapter 3, these responses may be very diverse in their manifestation and their characteristics. As stated in the introduction of this thesis, behavioural responses to implemented policies are left out of consideration in this text, as they posit a different research problem. There is, however, a differing level of action implied in possible responses to policy proposals. In some cases, responses can require more effort on the part of the citizen, not only passive stance. In this manner, *support* and *acceptability*, as well as *willingness to pay*, all differ at least intuitively in how much effort or how much conviction citizens have to express in order to manifest a positive evaluation of a policy.

There is an important distinction to be made between these intuitive interpretations, i.e., *concepts-by-intuition*, and *concepts-by-postulation* (Saris & Gallhofer, 2014), which are the broader concepts researchers are usually interested in, attitudes for one. These more complex concepts need to be operationalised and measured somehow and for that purpose defined with more intuitive concepts intelligible to respondents. Words like *support*, *acceptability*, or *willingness to pay* imply different intuitive understandings and concepts for most respondents. Similarly, there are natural differences between *to oppose* and *not to accept* and many other possible responses, such as *ignoring* the policy, *not caring* about it, or others. These responses may result in different levels of what is currently in summary called *acceptability* or *support* and is, in fact, a *concept-by-definition*. Researchers need to mind the difference between these two categories of concepts in order to formulate clearly research strategies, measures, concept definitions, and results.

Specification of responses should always regard the actual meaning and respondents' understanding of the chosen wording. There is an inherent ambiguity in any of these words and their possible differences, even amplified in cross-cultural surveys, since different

languages can use different words and some words may be even absent (see for example Study 1 in this thesis, where the Czech formulation used in a survey does not entirely correspond with any possible translation to English).

One way to avoid the problem of different words and their translations is to provide respondents with choices of what policies should be adopted, instead of evaluative scales. This approach is represented for example by stated preference methods widely used in economics, or referendum questions, presenting a hypothetical local or national referendum to respondents and asking them how they would vote. The referendum can have either *yes* or *no* options, or two or more policy options to choose from.

The advantage of choices is that they provide richer context (see below) and a relative perspective. Citizens do not make decisions in isolation in real life. In surveys, the isolated decision is closer to a laboratory environment than to everyday reality. Many respondents are not aware that giving money to fund mitigation would mean less money in pensions, for example. Such context can drastically change their responses. Offering choices draws respondents' attention to context of their decisions and may improve the relationship between their answers in hypothetical scenarios and in real public debate (something which is difficult to measure or confirm). Moreover, the choice of what mitigation strategy should be adopted or what policy should be voted for in a referendum is closer to a real-life situation which may be more familiar to respondents than a task to rate *acceptability* on a scale. This reasoning, however, so far lacks broader empirical support given the negligible number of methodological studies in the field.

Within the framework proposed above, the key proposition is to carefully select and design policy responses in accordance with the research question or the research problem and with awareness of possible limitations different policy responses posit for the selection of analyses, models, and variables and the interpretation of results. In case of policy *acceptability* specifically, interpretation is limited to reading the results as a *potential* to accept. Some individual characteristics and policy-specific conditions may increase this potential, while others may decrease it, others not affect it, and yet others omitted and their effects not known at all. The last group is important, since crucial conditions can be omitted.

Where the goal is to assess the overall evaluative tendency of the public regarding a specific policy, multiple measures of different responses either within one class (e.g., *support to opposition*) or from different classes, should be applied to obtain more nuanced and detailed results. Such approach also helps to triangulate the actual underlying attitude and provides comparison between possible responses, thus contributing to the methodological debate about measurement of public responses to policies.

5.2. Climate change mitigation policies as evaluated objects and mental representations

As discussed in chapter 2 on the role of public opinion in policy-making processes, citizens are not thoroughly informed and are mostly not so keen to get informed on issues such as climate or environmental policy unless the issue at hand gains high saliency through public or political debate or by spatial, social, or emotional proximity to citizens. In such a situation, we cannot assume respondents will understand a policy in the same way as researchers do. For example, taxes and subsidies are entirely different and unrelated instruments for many citizens, although subsidies cannot be financed without taxes. Yet the cost of subsidies is often not reflected by respondents in their answers to survey questions. This is the most obvious and clear-cut example. Other differences in understanding of policies by experts and lay people may be very subtle, yet very substantial. A similar discussion is long held within the field of risk perception – recall the famous “expert-lay gap” between lay and expert perceptions of risk defined probabilistically. In the end, this “gap” is probably caused by the probabilistic definition of risk itself. Lay people just do not think about risk in such a probabilistic way and utilise other strategies and perspectives, that are not necessarily seen as “rational” from the expert point of view, but are nevertheless ontologically valid strategies of how to deal with uncertainty (Kyselá, 2013; Lupton, 1999). Similarly, climate policy, containing large portions of uncertainty itself and dealing with a very complex issue in a very complex political and economic environment on top of that, is a tough nut for citizens to crack.

Specificities of different policy alternatives may be reflected only if they interact in some way with the individual’s desired model of society. Staerklé (Staerklé, 2009, p. 1096) argues that “most citizens are actually aware of political alternatives, but not necessarily in their expert formulations. They know the kind of society they are attracted to and the models of society they oppose, in terms of its level of cultural diversity, individual freedom or social equality, for example. [...] Accordingly, policy attitudes refer to individual evaluations concerning the desirability and legitimacy of different models of society.”

As shown earlier, perceived effectiveness in terms of both environmental and behavioural impacts, and perceived fairness of distribution of policy costs are key factors influencing public responses to climate policies. These two characteristics can interact with the respondent’s desired model of society greatly, since they relate to individual freedom and redistribution of wealth in society. Political orientation and general views on the role of government in the administration of public affairs are very influential, furthermore suggesting that proposed policies are evaluated in relation to the desired model of society.

People often hold seemingly contradictory attitudes and this can be interpreted as a sign of mis-information or lack of information (Converse, 2006 as also discussed earlier). On the other hand, however, it can also be a consequence of ambivalence and inconsistencies inherently present in political culture and of competing values or models of social organisation (Staerklé, 2009; see also Hochschild, 1981). Such ambivalence and presence of seeming inconsistencies in measured responses is an apparent challenge for social research. Not only since it is hard to contain it or reflect it with sufficient precision and unambiguity, but since it disputes the frequent and unspoken assumption, which can be formulated as a question: “Do respondents understand this policy?” Considering what have been just argued, this question should be completed: “Do respondents understand this policy *the way experts do?*”. Only asking in this manner are we fair to citizens. A better question for most research goals and purposes in the field would be yet another: “*How* do respondents understand this

policy?”, leaving space for respondents’ own narratives and understanding and offering new opportunities for research, since other policy characteristics, previously overlooked by researchers, may prove to be important to citizens.

These considerations implicate the importance of qualitative research in exploration and examination of public responses to policies. At minimum, pre-survey semi-structured interviews should be conducted, apart from piloting the survey instrument as such, with the purpose to collect citizens’ ideas and notions as well as perceptions of importance of different characteristics of climate policies and the understanding of any such political endeavour. The data collected via these interviews should then feed in the construction of the dependent variables in order to formulate both responses and evaluated policies in accordance with the common understanding among the public rather than experts. Ajzen (2002) advocated similar approach for application of his model of the Theory of Planned Behavior (TPB). The TPB posits that the intention to behave in a certain way is determined, among other things, by an attitude toward the behaviour in question. This attitude is further determined by behavioural beliefs, i.e., beliefs about the consequences of the behaviour. These beliefs should, according to Ajzen, be elicited beforehand in a pre-survey in order to reflect the reality and context in which the model is applied. Moreover, the behaviour and the measures of independent variables, including behavioural intention, should be formulated with the same level of specificity to increase correspondence between the measures and between intention and actual behaviour (which is scarcely measured or examined, given the obvious difficulty of such task in a survey situation). As Heberlein (2012, p. 63) puts it: “Attitude measures more specific to the attitude object and the act itself show higher correlations with observed behaviors. More general attitudes influence a greater variety of relevant behaviors but at weaker levels. Attitudes measured at very general levels should not be expected to be associated with a specific behaviour.”

In a similar fashion, attitudes measured at very general levels should not be expected to be associated with a specific policy response. The correspondence principle should be applied in the measurement of policy responses too. More so given the hypotheticality of most policies presented to respondents. A more realistic scenario will not, for sure, guarantee a correspondence of attitudes measured by responses to hypothetical policies and real-time attitudes once policy is proposed, but it can improve our estimations (recall the debate about the so called “value-action gap”, e.g., Blake, 1999) and our understanding of what makes the evaluations “tick”, i.e., what characteristics are important and how they interact with other variables.

As discussed earlier, measures of public responses to general policy endeavours leave respondents with a lot of freedom to imagine whatever they want under the general formulation used (e.g., “climate policy”). This freedom, however, limits researchers, since they have no control over these ideas and can also hardly account for them in their analyses and interpretation. Policy specifications, on top of that, can have surprising effects, resulting in a diametrically different or even contradictory answers. Thus, carefully specifying the evaluated object and the use of experimental designs allowing to vary the specifications in defined attributes can substantially improve analyses and our knowledge about the issue.

Policies can be specified with respect to several generally delimited key characteristics:

- goals (environmental, but also behavioural – including targeted behaviours),
- economic sector and groups or segments of population or social actors targeted by the policy,
- instruments proposed to attain the goals,
- costs of the policy and their distribution,
- use of revenues,
- benefits of the policy (generally related to its goals, but co-benefits may also be important),
- and others identified in a pre-survey stage as particularly important for the case at hand.

The choice of policy characteristics and their formulation should again be based on research goals and on a pre-survey exploring respondents' ideas.

Since policy-specific characteristics can be influential as factors related to the degree of positive evaluation of a policy, it is useful to be able to control some variation in those characteristics that are likely to significantly influence evaluations. To do so, experimental designs come quite handy. Changing the levels of specified policy attributes can reveal how sensitive citizens are to the attribute and to its changes (see for example Study 3 and the interaction between policy characteristics and political orientation).

There is a variety of techniques and measurement strategies in economics eliciting respondents' stated preferences (see Carson & Louviere, 2011 for overview). Although the concept of preferences as used in economics has some conceptual issues (see section 3.1), the same research strategies can be successfully used to measure attitudes while avoiding some pitfalls of attitudinal scales, like problems with specifying policy options (see below). Some of the stated preference elicitation approaches are based on a direct question whether the respondent would be willing to pay a certain amount of money for a specific policy. Such questions, in general, are part of a larger group of *matching methods* (Carson & Louviere, 2011). The goal is to provide an amount of money respondents are willing to pay or accept. This type of stated preference elicitation does not offer any substantial advantage compared to attitudinal scales. The second group of methods, however, is based on respondents' choices from a set of options. These are *discrete choice experiments* (DCE). Again, there are several ways how to design such choice situations, including binary choice question (offering a policy option and a status-quo) and selection from multiple policy options.

The amount of money modelled through DCEs is, in terms of the concept of policy attitudes proposed in this thesis, a specific type of policy response, i.e., an expression of policy attitude. An advantage of well-designed DCEs is that they allow researchers to define and vary policy specific characteristics, i.e., attributes, and to model respondents' willingness to pay for these attributes, thus exploring their relative importance and their influence on attitudes toward different policies.

Moreover, by attaching monetary value, stated preference methods also allow us to model and estimate the aggregate willingness to pay of the public. Although this number can be overestimated given the hypotheticality of the choices and "payments" made by the respondents (see Carson & Czajkowski, 2012 for an overview and debate), the results are usually encouraging in terms of the ability and willingness of citizens to partake in climate action even if interpreted sceptically.

Stated preference methods have been successfully applied to public responses to policies (see Zvěřinová et al., 2014 for detailed overview) and have also been successfully combined with social-psychological models explaining the variations in respondents' preferences and willingness to pay (e.g., Hansla et al., 2008). Such combined approaches are very fruitful since the perception and evaluation of policy specific attributes may differ considerably among individuals with different social-psychological characteristics. If the goal is to propose targeted communication strategies, a combined stated preference approach is particularly suitable to the task.

On the other hand, such approaches can be quite demanding for both researchers and respondents (especially DCEs with several attributes). Estimating willingness to pay is a challenging task involving decisions that should be made with full knowledge of the method. Moreover, more sophisticated choice designs can be simply too much for the respondents, since they require their full concentration and consideration of several pieces of new information (although with use of computers and new designs, it can be even fun). With such high requirements, researchers can opt for simpler designs or variations of the method, involving less variability in policy attributes, but still utilising the advantage of policy specification and contextualisation of choices used to examine respondents' attitudes.

Some may point to the different character of results obtained by making choices rather than providing evaluation on a scale. While the latter is seemingly an absolute evaluation, the former is an evaluation of an object relative to another object or a variation of the same object. I argue that this is not an obstacle if reflected within the interpretation of the results. On the contrary, the contextualisation within a choice provides more information, rather than less, since respondents always evaluate entities with respect to other possibilities, although not always intentionally or deliberately. If we provide context, we have greater control over it and can control it within our analyses. Such greater control is needed given that evaluations of different policies are based on various considerations, which furthermore impedes comparability and interpretation of results.

5.3. Different predictors of public responses to climate change policies

As reported throughout the presented review, attitudes toward different policy instruments may have different relationships with other variables and may evoke different sets of relevant values, concerns, or beliefs. Such variability is partly a result of the variety of ways of defining and operationalising policy attitudes as dependent variables.

A similar variety exists within the field of environmentally significant behaviour. Kollmus and Agyeman (2002) overviewed several key theoretical models of environmentally significant behaviour and concluded that all overviewed models have some explanatory power in some situations. Environmentally significant behaviour is, according to the authors, too complex to be explained by a single model or theory. Wilson and Chatterton (2011) also argue that the simultaneous use of multiple models is the result of complexity and diversity of emission reduction behaviours. Thus, different models may represent or define different problems and ask different questions. A unified or universal approach disregarding situational context, as well as differences in methods, measurement, and definitions of the problem (e.g., defining other public responses to policies than *acceptability* or *support*), would unnecessarily limit the scope of the research and its ability to explore new ideas and areas of the field.

From the perspective of practical policy-making, which is the perspective often pursued by both researchers and policy-makers in this field, the value of such universal model would be questionable, given the reduction of information necessary to formulate a model that would “fit” all policies or policy responses. Moreover, as Brännlund and Persson (2012, p. 716) concluded their study: “Although people obviously attach significant value to a number of attributes, it is hard (impossible) to define any rules that account for this. Since the experiment was made up of hypothetical policy instruments, it is not possible to draw any conclusions on the particular instrument that people would prefer for reducing CO₂”. Their conclusion is in line with the results summarized and reviewed in this dissertation, pointing out the difficulty and limitations of formulating policy recommendations within this domain.

Despite the aforementioned variety, the steady associations with variables such as education, environmental concern, or some value orientations with evaluations of climate-related taxes as well as composite measures and measures of positive evaluation toward general mitigation action suggest that there indeed is a common value-based core of policy attitudes, regardless in what detail is the policy presented or what climate policy or instrument it actually is.

The proposed framework (Figure 13) is therefore based on an assumption (supported by the results overviewed in this study) that there is a general value-based climate policy attitude. This general attitude, however, is unmeasurable as such – it translates into a more specific policy responses which are context- and policy-formulation-dependent. The translation of a general attitude into a policy-specific response is rather complex and cannot be modelled with pre-defined generalised measures. As suggested earlier, policy-specific and contextual measures should be designed with respect to evaluated policy or policies. Nevertheless, with awareness of these limitations owing to the hypotheticality, complexity, and often generality of the attitude object explored, there are some factors which can be seen as “common” with a relatively high degree of confidence (see chapter 4).

The framework, based on the results and performance of the VBN model, proposes that climate policy attitude is embedded in **general value orientations**. The VBN model stems

from Schwartz's (Schwartz, 1977) conceptualisation and proposes three core value orientations: biospheric, altruistic, and egoistic. Different orientations can be relevant for different policies (see above), hence it is certainly worthwhile to include all of them or to even ponder relevance of alternatively defined or conceptualised general value orientations.

General values are usually a basis for more specific value orientations or attitudes, such as environmental values, political orientation, and trust toward government. Usually measured by the NEP scale (Dunlap et al., 2000), **environmental values** are undoubtedly one of the most influential factors related to policy responses, as summarized in section 4.2. Any model or endeavour to explain public responses to climate change or environmental policies should account for them. Their influence on awareness of consequences or environmental concern (conceived closer to risk perception) in the framework is adopted from the VBN theory, which posits the line of influence from general value orientations, through environmental values and awareness of consequences to ascription of responsibility and personal norm (which then leads to action). The proposed framework, however, adds three other factors related to this specific domain of attitudes: political orientation, attitudes toward public governance, and trust toward government and its actions as stemming from attitudes toward public governance.

Political orientation is a powerful ideological lenses through which citizens perceive and receive information and often serves as a cue to decide on issues citizens are less or not at all familiar with (Hart & Nisbet, 2011; Rugeley & Gerlach, 2012). Political orientation is likely to interact with policy-specific characteristics and influence their perception and desirability as conceived by citizens. Political orientation should be formulated with consideration of attitudes toward public governance, which influence the felt desirability of any climate policy. For example, left oriented citizens may be more often in favour of state interventions, but in some countries or contexts, the meaning of left-oriented may be far more politically liberal. Therefore, more comprehensive, and preferably more culturally universal measures of political orientation should be embraced.

Political orientation also relates to **trust toward government**. Not only because trust heavily depends on who is presently in the government, but also because their actions may, or may not, be in line with the general political orientation of the respondent. Trust is important with respect to whether the government is able to do what it proposes to do and whether it can be trusted regarding its intentions (Hammar & Jagers, 2006; Jagers et al., 2010; J. Kim et al., 2013). Measures of trust should be both general and domain-specific. It could be very interesting to see whether there are certain policy-specific characteristics that are particularly susceptible to the negative influence of distrust, for example the use of revenues (Dresner et al., 2006; Kallbekken & Aasen, 2010; Kaplowitz & McCright, 2015).

Interestingly, the VBN theory model (see section 4.2) has been adopted to policy responses as it was proposed for environmentally significant behaviours – that is with the concepts of personal norm and ascription of responsibility focusing on individuals themselves and omitting other actors, such as governments (Nordfjærn & Rundmo, 2015; Rhodes et al., 2014; Steg et al., 2011, 2005). Yet, both personal norm and ascription of responsibility were formulated with consideration of the government and industry rather than individuals (Stern, Dietz, & Black, 1985) in an early application of the Norm Activation Model (a predecessor of the VBN theory model) on attitudes toward environmental protection. According to the results of a study by Stern and colleagues (1985), government was regarded as morally obliged to act even though it was not held responsible for the environmental damage. Based

on the results on importance of policy specific beliefs, policy characteristics, and trust toward the government, it is argued that the perceived responsibility and moral obligation of the government to act should be accounted for in models of attitudes towards climate change mitigation policy.

The previous argument does not diminish the role of individual responsibility and sense of moral obligation to act personally. Rather, it is argued that the importance of the two norms varies with different policy responses. Where intention or willingness to act is included in the dependent variable, individuals' own personal norm or ascription of responsibility to himself or herself will be more important compared to a model of policy acceptability as a passive reaction to a policy proposed by the government. Similarly, if the policy in question targets individual behaviours which would have to be changed because of that policy, personal norm could play a more substantive role. On the other hand, if the respondent does not have a sense of moral obligation to act personally, it does not necessarily mean they would not support a policy. They can still think it is someone's, likely the government's, responsibility to act and would approve of such action.

All factors discussed so far are proposed to form the general value basis of attitude toward climate change policies. Again, the proposed framework is not a theory or a comprehensive model, it serves as a heuristical tool for conceptualisation and construction of contextualised models. For it is argued that despite the existence of general value basis, the specification of evaluated policies can introduce an influence of other value orientations, attitudes, and beliefs which are not part of the framework, but may play a major role in formulation of specific policy responses. Researchers should review results and theories working with similar attitude object even within other fields of inquiry to propose variables most likely to be relevant for the given object. This, however, should not be done in an entirely *ad hoc* manner. Rather, existing models or frameworks, such as the one proposed here, should form a basis of empirically tested models in order to increase comparability of results.

The general value basis of attitude toward climate change policies can also be "overruled" by certain aspects of a specific context or situation. In social-psychological research of behaviours and their determinants, the link between attitude (or attitude-based intention) and action is highly context-dependent. If situational and social constraints are present, the link is weak and the behaviour is a result of these constraints, rather than attitudes. If constraints are absent, the behaviour can be guided by attitudes for the most part (Heberlein, 2012). The proposition that a behaviour is a function of context and attitudes is also formulated in Stern's (2000) ABC theory, where A stands for attitudes, B for behaviour, and C for context. If external conditions of some action, for example recycling, are unfavourable, the influence of attitudes diminishes and only very strong and positive attitudes would have some influence on the resulting action. If the conditions, however, are favourable, even less positive and weak attitudes can tip the scales and determine the course of action.

The link between attitudes and policy responses may be tighter given the nature of the dependent variable (attitudinal response). Nevertheless, such a proposition has, so far, only limited empirical support and hence it should be assumed that even in this case, context can play a crucial role and should not be neglected.

The nature of behavioural and situational constraints and limits depends on the nature and specification of the policy response in question. For willingness to pay, for example, the obvious constraint would be budgetary. For policies targeting behaviours, the limits perceived by respondents would likely reflect the perceived limits of their behaviour change

(e.g., they cannot switch to public transport and hence would not see a point in supporting a public transport scheme). Moreover, citizens can see limits on the part of the government or other citizens often related to issues of trust and feasibility, ideas of efficacy of actors, and policy characteristics (“This will never be voted for”, “Government does not have money/political mandate/capacity to do this” etc.).

Most theories and models used in the research on attitudes toward climate change mitigation policy share a common focus on individual attitudes or behaviour and their explanation by characteristics of the individual. This focus is partially a result of the dominance of psychology in the field and partially of the policy makers’ demand for behaviour changing interventions and policies (Jackson, 2005). Such focus on individuals and methodological individualism has been criticized by some sociologists for ascribing responsibility for acting to individuals (Shove, 2010a). Similarly, the focus on *acceptability* has been, as discussed earlier, criticized for treating citizens as passive receivers of policy proposals on one hand (Batel et al., 2013) and yet responsible for (not) *accepting* these proposals and hence for resulting policy failures on the other.

At the same time, governments maintain unsustainable institutions and life-styles by structuring options and opportunities of the citizens. These institutional factors, as well as other societal and cultural ones, are usually neglected and omitted from consideration by both researchers and policy makers (Shove, 2010a). Individuals are often *locked in* unsustainable consumption patterns (Jackson, 2005), while models of behaviour list only limited number and types of contextual factors (such as habit and routine) and focus heavily on choice. According to Shove (2011), the issue can hardly be overcome by interdisciplinary integration of models and theories, as proposed for example by Whitmarsh and colleagues (2011).

In case of policy responses, the institutional **context** is particularly important and is on most occasions and implicitly embodied within the debated policy itself. If not in its specification, then possibly in how respondents think about the policy or policy instrument, i.e., in their perceptions and understanding of the current political and institutional context (e.g., “We do not need any new taxes”, “The current government would never propose this, since recent policies are everything but environmentally responsible”³⁶). These considerations, however, are often undetected by researchers, hence the question whether they have some influence on the resulting policy responses remains open.

In sum, researchers should 1) identify in qualitative pre-surveys what contextual factors as perceived by respondents could mirror in their attitudes and policy responses; and 2) identify by deliberation of existing or emerging theories and by analysis of the current political and economic context what contextual factors could influence citizens’ attitudes and responses independently of respondents’ perceptions. The need for the second perspective stems from the point made by Shove (2010a, 2011) and others (Giddens, 1986) that attitudes and behaviours or practices are not determined by solely social-psychological constructs and perceptions, but also by objective structures limiting and enabling individual action or routine by advantaging certain institutions as stable and recurring patterns of behaviour over others. Within these institutions and practices as stable frames of routine day-to-day life, attitudes are formed and new information interpreted, usually in a manner to fit in or even strengthen the felt consistency of one’s behaviours, beliefs, and attitudes. In effect, attitudes cannot be separated from their behavioural context as both a likely result *and* possible determinant,

³⁶ Although not exact citations, similar claims had been repeatedly made in a qualitative pre-survey to the CECILIA2050 study analysed in Study 3 in this dissertation.

even though it is, in most cases, necessary and useful analytical practice to do so (every model of reality must simplify the object of study).

Since we simply are not able to analyse the whole context in its complexity and must balance it with parsimony of models and analyses, a way to go is to identify the most probable influential factors as suggested above. More specifically, based on the results of the present systematic literature review, these factors could include:

- economic situation on both micro- and macro- level, i.e., individual budgetary constraints reflected in respondents' consideration of cost of the proposed policies and the current economic situation of the region – stability, employment, growth and relative wealth of specific segments of population;
- policy configuration reflecting existing policies and policy communication of the government – whether it is in line with the presented policy or not, i.e., whether there is some consistency in the suggested and existing policy-making processes;
- civil society and possibilities and options of citizens to contribute to the policy-making process and express their opinions, including the vote, its date, related political debate, and whether this topic has some saliency within it;
- environmental conditions.

The resulting policy response can be affected by both objective state of these factors and/or their perception or perception of their aspects. With environmental conditions, for example, objective conditions are often translated by perceptions, otherwise they are usually not influential (see section 4.3). Studies exploring the effect of an actual state in any of these domains are so far lacking. Therefore, more studies reflecting the interaction of variables at individual and macro- levels are needed as well as studies stemming from other theoretical traditions.

A specific case of context is the policy itself. As discussed before, policy formulation and operationalisation and measurement of the dependent variable provide important information and context for respondents' consideration and answers. **Perception of policy characteristics** is therefore undoubtedly an essential part of the proposed framework. What policy characteristics should be included, however, is a matter for broader discussion. Based on the literature review conducted within this dissertation, several characteristics seem to be relevant in most analysed cases:

- environmental and behavioural effectiveness;
- cost (or benefit) distribution and
- its fairness;
- coerciveness, i.e., infringement on personal freedom;
- choice of instrument;
- goal;
- use of revenues.

Perceived **effectiveness** and **fairness** are usually statistically significant factors in policy responses despite the variability and fragmentariness of definitions, operationalisation, and measurement of the two characteristics (see section 4.3). This fragmentariness is only partially caused by the diversity of policies explored. Most researchers define and operationalise policy characteristics in a very *ad hoc* manner even if using general measures and not reflecting some specific policy characteristics and their relevance to either environmental or behavioural effectiveness or fairness in cost distribution. Moreover, different effects or fairness principles are formulated and offered to respondents,

furthermore decreasing comparability of the results on one hand and increasing opportunity for learning something novel on the other. Hence, the diversity is not something to be necessarily avoided, but should be always reflected when interpreting results. For example, perceptions of behavioural and environmental effectiveness cannot be compared easily. Generalised conclusions regarding the influence of perception of policy characteristics are thus something that should be avoided or at least carefully deliberated.

Moreover, there can be many policy characteristics that were not yet examined by researchers and therefore their importance is unknown. Some studies explored the relevance of instrument-specific attributes, but these are, so far, rare examples. Potentially important characteristics should be identified during preparatory phases of the research on the bases of research goals and interests and/or respondents' perceptions and beliefs elicited in a pre-survey. Similar practice should be adopted with respect to formulation and specification of those characteristics already identified as influential in general, i.e., effectiveness, fairness, coerciveness, and others.

Other characteristics identified by respondents or researchers could be policy or instrument specific and could include for example:

- policy maker, organisation, or other actor proposing or supporting the policy;
- institutional bodies responsible for policy implementation and control;
- control mechanisms;
- policy communication strategy;
- impacts of the policy in other sectors of economy;
- timing and schedule of policy implementation, its effects etc.

As shown in Study 3, perception of different policy characteristics of diverse policy instruments is related to a diversity of beliefs, values, or attitudes, most of which we do not know yet. Moreover, policy characteristics are not part of the most prevalent theoretical models. Therefore, exploratory studies are needed, suggesting new hypotheses to be tested in quantitative studies.

In sum, future research should test the strength and nature of relationships of public attitudes toward climate change mitigation policies with factors so far identified as common to most such policies. It also should explore relationships that are policy-specific, i.e., examine the interactions between policy characteristics, their perceptions, and other beliefs, worldviews, and broader context. Both these tasks should be carried out systematically with common understanding of what is measured, how, and why. The proposed framework is a suggestion of a heuristical tool for these purposes, offering a common ground and yet enabling researchers to contextualise their own research tasks.

6. Conclusion

The goals of this thesis were to propose a definition of policy attitudes and responses embedded in a sound theoretical background and to formulate a framework for assessment of public attitudes toward climate change mitigation policies. The framework, incorporating the definition of policy attitudes, is designed as a heuristical tool helping researchers with decisions regarding formulation of research questions, measurement of policy attitudes, and selection of factors to be included in their models explaining and/or predicting policy attitudes, as well as reviewing and interpreting existing results.

Why is such a framework needed? As evidenced in the extensive literature review presented in this thesis, the current research is fragmentized and unsystematic, especially with respect to the definition and measurement of policy attitudes, usually termed *policy acceptability* or *policy support*. There is a great diversity of measures currently used to assess citizens' views on climate change mitigation policies. There are, however, only few studies examining conceptual and methodological implications of different question formulations and exploring differences between various constructs. So far, *policy acceptability* and *policy support* have predominantly been treated as synonyms. As evidenced here, however, such assumption about interchangeability of both constructs is unfounded. On the contrary, existing evidence overviewed in chapter 3 suggests there are important differences between not only these two constructs, but between measures of policy attitudes differing with respect to a) the type of response (e.g., support, passive acceptance, potential to accept etc.) and b) policy formulation (a specific policy proposal or climate action in general). With use of measures differing in these two key aspects (and possibly others, less important), different research questions are being asked. The considerable diversity in existing results therefore reflects not only heterogeneity of attitudes, populations, and contexts, but also the diversity of measurement instruments. Hence, heuristical tools such as the framework proposed in this thesis aid researchers in their methodological decisions and in interpretation of existing results. Simply put, the aim of such a framework is to provide a bigger picture.

The framework is not designed as a fixed theoretical model. On the contrary, it is proposed as adaptable to specific research questions, policy contexts, and situations. Several types of relevant research questions are subsumed under the framework. Namely, questions examining factors related to a specific public response to either specific policy proposal or climate change policy action in general or questions examining how publics may respond to a specific policy proposal or climate change policy action in general. As discussed in chapter 4, existing results are dependent on context and on policy formulation. Therefore, different factors are expected to have various relationships with and effects on policy attitudes expressed in such diverse ways. Moreover, only contextualised research and results can provide information relevant to the policy problem at hand with sufficient understanding and detail, simultaneously avoiding the pitfalls of excessive generality and oversimplification. Thus, the framework is open to adjustment to fit specific cases and contexts.

There are two key elements of the framework: 1) the construct of policy attitudes and responses as dependent variables, and 2) the selection and disposition of factors related to policy attitudes. A systematic review of 164 empirical studies of public responses to climate change mitigation policies published from 2000 onwards was conducted with the aims to review existing measures of policy attitudes, to inform the formulation of policy attitudes construct, and to identify and summarize the factors related to policy attitudes.

Policy attitudes are proposed in this thesis as a concept overarching previously used terms and constructs, such as *policy support* or *acceptability*. The formulation of the concept and its operationalisation are informed by current practice of measurement and grounded in the definition of attitudes as formulated by Eagly and Chaiken (1993, p. 1). The corner stone of the concept of policy attitudes presented in this dissertation is the distinction between the attitude itself and responses through which it manifests. *Acceptability*, *acceptance*, and *support* are defined as distinct and possibly empirically distinguishable classes of evaluative responses stemming from an underlying psychological tendency “that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1993, p. 1). Such approach to policy attitudes enables us to reconcile the diversity in results obtained using different measures and the idea and evidence of consistency in individual policy evaluations.

Moreover, existing measures of attitudes toward climate change mitigation policies limit the current research to only a small subset of possible responses, therefore reflecting reality only partially and providing incomplete, and maybe even misleading, results. Other possible responses should therefore be examined and included in research designs with careful embedding in core concepts of attitudes and consideration of possible links to other responses. These methodological issues further represent a large and challenging task for future research.

Some recommendations to researchers pursuing assessment of public responses to mitigation policies are made based on the review and discussion of existing practice in chapter 3:

- Researchers should carefully consider and deliberate what responses to measure. If the research question is formulated with a specific response in mind, the used measure should adhere to it. If, on the other hand, a specific response is not the subject, a multitude of them should be included at least in the pre-survey.
- Two approaches to defining climate policy as an attitude object were distinguished: examining either an overall attitude to governmental action on climate change, or policy-specific attitudes. Both approaches have certain limitations which should be reflected in the interpretation of results.
- The formulation of the proposed policy should be based on the results of previous studies examining similar policies and a pilot or pre-survey exploring the meanings respondents associate with different labels or policy characteristics.
- Qualitative pre-surveys should be used to elicit policy characteristics important to citizens in each context, if there are no specific characteristics important to the researchers or policy-makers.
- With respect to measuring attitudes toward governmental mitigation action in general, composite measures are usually preferable to single items.

Once the dependent variable is properly defined and operationalised, the framework proposes a set of variables (or groups of variables), that may help to explain or predict public responses to climate change mitigation policies. The fundamental structure of the framework is formed by the Value-Belief-Norm theory model, which assumes a causal chain from general value orientations through environmental values, awareness of consequences of a given environmental problem, and ascription of responsibility (usually to oneself) to subjective norm, which is activated in response to the previous stimuli and in turn leads to a performance of environmentally-significant behaviour (Stern, 2000; Stern et al., 1999, 1995).

While the core proposition of the VBN theory model is retained in the proposed framework, some changes are made to adapt the model to a more attitudinal concept as a dependent variable and to an alternative role of the citizen - from a more-or-less active performer of behaviours and practices to a rather passive evaluator of governmental proposals.

Thus, general value orientations are hypothesised to influence environmental values on one hand and political orientation on the other. Political orientation then relates to trust in government or potentially in other actors, such as other people, business, media etc. (although these are usually not important according to the existing results). The proposed causal chain then leads to the ascription of responsibility to self and/or the government, whichever may be relevant in a specific case (both are usually at least partly relevant depending on context and formulated response). Ascription of responsibility furthermore influences attitude toward climate action in general. This attitude is unmeasurable by itself and can be examined only through its expressions in responses as formulated by researchers or observed in day-to-day practice. These expressions, however, are not simple and direct translations of the underlying attitude. Characteristics of the policy as well as context both intervene and may introduce variability. Perception of policy effectiveness, fairness, and coerciveness, as well as other perceived characteristics and policy labels, may change the importance of different factors and may result in differences in measured responses to different policies or policy instruments. Similarly, the formulation of response itself introduces variance into expressed evaluations.

Other variables may be introduced into models based on the framework and some of those already included in it may be omitted. Nevertheless, existing evidence suggests that those factors proposed to be part of the framework are universally important across policies and responses, although the strength of their importance varies. Selection of specific measures of policy characteristics in particular, and other variables in general, as well as the formulation of proposed policies, should be informed by qualitative pre-surveys assessing citizens' understanding and perceptions of given policies and policy proposals.

Three studies were included in the thesis to empirically support the presented arguments and propositions. Study 1 has shown the differences between measures currently used simultaneously as measures of *policy support*, pointing out the limitations in comparability and generalisability of existing results. Study 2 is a good example of interactions between policy characteristics and individual beliefs, namely political orientation. Last, study 3 has pointed out differences between factors related to perceived characteristics of different policy instruments and how perception of these characteristics may fit into models of policy attitudes.

As discussed in chapter 2, the research overviewed and presented here is highly policy-relevant and policy makers seek advice in its results. Therefore, several recommendations to policy makers were also formulated (see chapter 7 following this conclusion) based on the results and conclusions presented and summarized in the thesis and on the proposed framework:

- Citizens' trust should be actively built and gained through principles of transparency and straightforward and clear policy communication and formulation.
- The proposed policy should be fair in distribution of costs and burdens. Most often, polluters are regarded as those, who should contribute more.

- Policy communication should show people their own ability to do something with climate change through drawing attention to positive effects of mitigation policies.
- Policy characteristics important to the public should be identified early in the policy-making process and addressed properly.
- Combining instruments could not only increase environmental effectiveness of the policy, but can also improve public opinion if properly communicated. The entire policy mix should be identifiable as a single and coherent policy which is representable to the public and comprehensible as such.
- Communication strategies should be targeted, especially to population segments more sceptical or negative toward policy proposal and should address factors contributing to this scepticism.

Finally, results on policy responses and especially results on *policy acceptability* should be regarded and interpreted with utmost respect to their potentiality. High context-dependency of policy responses as expressions of underlying attitude means that the results obtained within the context of a survey can change very quickly with a change in situation and context. Therefore, researchers should be careful with their conclusions and should be always aware of these limitations, especially if advising policy makers. Providing general conclusions with no regard to the context and possible interactions of policy-specific characteristics, policy and response formulation, and population characteristics may mislead the policy-making process at worst or miss important opportunities for policy communication at least.

7. Policy summary: Changing policy attitudes and responses?

The goal of many studies reviewed in this thesis was to understand policy attitudes in order to inform policy-making. In this respect, the aim is often to promote positive attitudes and responses and to shift the overall public opinion toward popular support of climate change mitigation action in general or specific policies and instruments. The important questions in such context therefore are whether it is indeed possible to change policy attitudes and how it could be done.

The honest answer would probably be that there is no universal recipe. As shown in this dissertation, each policy may be related to different factors. Moreover, studies cannot predict the whole situation and context in which the actual policy proposal will be debated. With knowledge of several such limitations of research and its results and their interpretations discussed earlier, some general recommendations can nevertheless be made.

Develop trust. Trust in government is generally very likely to contribute to attitude formation. Other actors may also be important in specific cases and should be identified early in the policy-making process. (Dis)trust towards them should be properly addressed, especially if any of these actors are involved in the policy-making process (lobbying for example), will be subjected to the proposed policy, or will be responsible for policy control mechanisms.

In all cases, with government as the primary focus, citizens' trust should be actively built and gained through principles of transparency and straightforward and clear policy communication and formulation. These principles should not be reflected only in a later phase of the policy-making process as is communication of the proposed policy to the public. Rather, they should be incorporated into the design of the policy itself. Policies that are easier to understand may often be perceived as more transparent. Earmarking is a good example of a straightforward principle which is usually contributing to more positive policy attitudes. Moreover, policy communication and formulation should be consistent and steady. Abrupt changes dissolve trust very quickly (Slovic, Layman, & Flynn, 1991).

Make it fair. The proposed policy should be fair in distribution of costs and burdens. This recommendation is easily said but harder to achieve, since public perceptions of what is fair may differ quite a lot. Most often, polluters are regarded as those, who should contribute more. This preference can, however, easily change depending upon who is defined or regarded as the polluter. Therefore, policies and policy proposals should be clear and transparent in who will bear the costs and why. Economic and environmental impacts should be assessed and communicated.

Communicate policy effects and effectiveness. Perceived environmental effectiveness is one of the most important factors related to policy attitudes. Rather than scare people with impacts of climate change, policy communication should show people their ability to do something with climate change through drawing attention to positive effects of mitigation policies. This includes communicating both goals and effects of the policy (including secondary benefits), as well as the capacity and efficacy of society to act. Although this proposition should be tested in future, several researchers have already concluded that fear can have inhibiting and discouraging effects on people and thus can backfire in policy communication. Positive emotions, on the other hand, can be empowering (Brügger et al., 2016; Hart, 2011; Smith & Leiserowitz, 2014).

Identify important policy characteristics. Except of perceived fairness and effectiveness, other characteristics may be particularly important in specific policy proposals and debates. These characteristics should be identified early in the policy-making process and addressed properly – either modifying them in policy design, or communicating them. Strengths of the policy can also be identified this way and used to develop messages about the policy.

Mix policy instruments but frame them together. Responses toward specific policy instruments can differ greatly. Therefore, combining instruments could not only increase environmental effectiveness of the policy, but can also improve public opinion if properly communicated. The design of policy mixes, however, should not be overly complicated and should adhere to the principles of transparency and straightforward formulation and design. The entire policy mix should be identifiable as a single and coherent policy which is representable to the public and comprehensible as such.

Develop targeted communication strategies. Especially in politically polarized publics, policy-makers should be aware of different segments of population with respect to their motivations and attitudes. Communication strategies should be targeted to population segments more sceptical or negative toward policy proposal and should address factors contributing to this scepticism. Targeting should be carefully balanced so the overall communication strategy would be consistent.

It must be also added, that the sole provision of information, even if it is targeted and tailored, does not have to be rewarded with noticeable changes in public's views and beliefs. The information-deficit model assuming that providing information will lead to citizens behaving rationally is argued to be misdirected (Shwom et al., 2010; Whitmarsh, Seyfang, & O'Neill, 2011). Knowledge alone, without connection to values and beliefs that would actually allow the reasoning leading to pro-environmental decisions, does not have to lead to higher popular policy support (Krosnick et al., 2006).

Moreover, policy-makers should not expect much from framing proposed policies – effects of frames are limited at best (McCright, Charters, Dentzman, & Dietz, 2016), since different frames may interact with different individual characteristics, such as policy orientation (T. H. Campbell & Kay, 2014; Howell, Capstick, & Whitmarsh, 2016; Study 3). On the other hand, denial counter-frames can be quite dangerous (McCright, Charters, et al., 2016), which reminds us of the fragility of every carefully constructed communication strategy.

Thus, although policy communication is important and can steer the public debate about policy proposals, citizens' values, attitudes, and beliefs should be considered and addressed early in the policy-making process and reflected in policy design. Policies shape the public space and citizens' lives in their day-to-day organisation, but also by agenda-setting, identification of problems and issues deserving further attention, by assigning certain characteristics to groups of people, by giving specific meanings to objects, groups or activities, and by defining terms and the way we speak about them. Policies support or constrain behaviour, redistribute resources, change what is to be citizen, and who is eligible for different public services and why (A. L. Campbell, 2012; Pacheco, 2013; Soss & Schram, 2007). Citizens may even adapt their values to values implicitly (or explicitly) present in policies, institutions, and overall governmental discourse (Hoff-Elmari et al., 2014; Svallfors, 2010).

Policy feedback between the public and the policy-making process is obviously hardly only organisational and economical. Svallfors (2007) terms it normative feedback. According to Soss and Schram (2007) such responsiveness on the part of the public is not warranted and

may follow especially policies that are visible and proximate to citizens' everyday lives. By acknowledging and using these mechanisms, positive attitudes toward certain policies can be gradually built by each policy step (Pacheco, 2013). Cox (2010) argues that **policy legitimacy** is best gained by linking policy with certain values, preferably those which will resonate among the public. Similarly, Matti (2009) defines policy legitimacy as "the extent to which values and beliefs underpinning public policy content correspond to those established among the public" (p. iii).

These accounts provide support to the claim that understanding policy attitudes and what drives them is important in the policy-making process. Not by the power of public opinion, but in the process of policy formulation by providing information on what values are relevant and may resonate (and how) with values inherent to the policy (Rugeley & Gerlach, 2012; Shwom et al., 2010).

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8. Appendix

8.1. Appendix to Study 1

Table 21: Univariate statistics and question wording – independent variables (original weighted data)

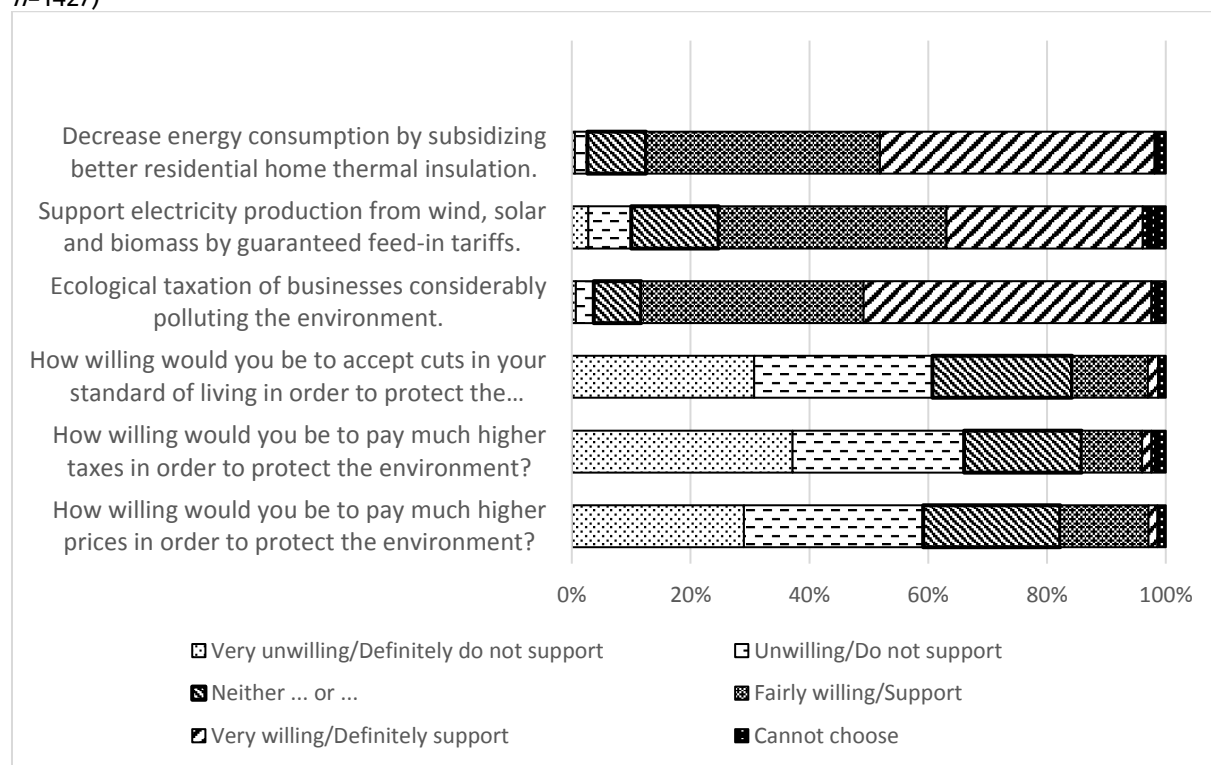
	Mean	sd	Min-Max	N		
Environmental concern	3.76	0.651	1–5	1306		
(1 – extremely dangerous for the environment; 5 – not dangerous at all for the environment)						
<i>In general, do you think that air pollution caused by cars is ...</i>						
<i>In general, do you think that air pollution caused by industry is ...</i>						
<i>And do you think that pesticides and chemicals used in farming are ...</i>						
<i>And do you think that pollution of COUNTRY’S rivers, lakes and streams is ...</i>						
<i>In general, do you think that a rise in the world’s temperature caused by climate change is ...</i>						
Self-efficacy	2.99	0.782	1–5	1323		
<i>Q: How much do you agree or disagree with each of these statements?</i>						
(1 – Agree strongly; 5 – Disagree strongly)						
<i>It is just too difficult for someone like me to do much about the environment</i>						
<i>There are more important things to do in life than protect the environment</i>						
<i>There is no point in doing what I can for the environment unless others do the same</i>						
<i>Many of the claims about environmental threats are exaggerated</i>						
<i>I find it hard to know whether the way I live is helpful or harmful to the environment</i>						
General social trust	2.68	0.980	1–5	1417		
<i>Generally speaking, would you say that most people can be trusted, or that you can’t be too careful in dealing with people?</i>						
<i>Please tick one box to show what you think, where 1 means you can’t be too careful and 5 means most people can be trusted.</i>						
<i>Generally speaking, do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?</i>						
<i>Please tick one box to show what you think, where 1 means most people would try to take advantage of you and 5 means that most people would try to be fair.</i>						
Postmaterialist value orientation						
	materialist	mixed	postmaterialist	Don’t know		
	35.3%	53.5%	6.8%	4.3%		
	(504)	(764)	(97)	(62)		
<i>Q: Looking at the list below, please tick a box next to the one thing you think should be [COUNTRY’S] highest priority, the most important thing it should do.</i>						
<i>Q: And which one do you think should be [COUNTRY’S] next highest priority, the second most important thing it should do?</i>						
1: Maintain order in the nation		2: Give people more say in government decisions				
3: Fight rising prices		4: Protect freedom of speech				
Trust towards politicians						
	Agree strongly	Agree	Neither agree nor disagree	Disagree	Disagree strongly	Don’t know
	34%	34.5%	20.6%	7%	2.4%	1.3%
	(485)	(493)	(295)	(100)	(35)	(19)
<i>Q: Most politicians are in politics only for what they can get out of it personally</i>						
Preferences for the role of the state						
	both individual action		both state regulation		Don’t know	
	7.8%		56.5%		13.9%	
	(111)		(807)		(198)	
<i>Government should let ordinary people/businesses decide for themselves how to protect the environment, even if it means they don’t always do the right thing</i>						
<i>Government should pass laws to make ordinary people/businesses protect the environment, even if it interferes with people’s rights to make their own decisions</i>						

Table 22: Kendall's tau-b correlation matrix for variables included in the model (original weighted data; $n=1427$)

	W. sacr.	Social trust	Envi. concern	Self-efficacy	Age	Social status	Political orient.	Pol. trust	Role of state	Postmat
Policy acceptability	0.010 $n=1390$	-0.056** $n=1416$	0.255** $n=1330$	0.104** $n=1350$	-0.092** $n=1418$	-0.001 $n=1389$	-0.002 $n=1187$	-0.116** $n=1415$	0.160** $n=1250$	0.025 $n=1368$
Will. to sacrifice	1.000	0.143** $n=1450$	0.148** $n=1347$	0.295** $n=1361$	-0.064 $n=1445$	0.221** $n=1409$	0.170** $n=1207$	0.150** $n=1444$	0.117** $n=1260$	0.189** $n=1396$
Social trust		1.000	-0.057** $n=1367$	0.086** $n=1389$	-0.034 $n=1480$	0.052* $n=1441$	0.070** $n=1229$	0.255** $n=1476$	0.043 $n=1287$	0.081** $n=1427$
Envi. concern			1.000	0.207** $n=1306$	-0.025 $n=1368$	-0.004 $n=1335$	-0.023 $n=1136$	-0.066** $n=1365$	0.110** $n=1215$	0.067** $n=1323$
Self-efficacy				1.000	-0.045* $n=1386$	0.149** $n=1358$	0.116** $n=1161$	0.108** $n=1386$	0.176** $n=1225$	0.120** $n=1336$
Age					1.000	-0.122** $n=1441$	-0.224** $n=1227$	-0.043* $n=1474$	0.028 $n=1286$	-0.137** $n=1423$
Social status						1.000	0.351** $n=1222$	0.134** $n=1437$	0.031 $n=1260$	0.116** $n=1390$
Political orient.							1.000	0.143** $n=1228$	0.026 $n=1086$	0.169** $n=1188$
Trust in politicians								1.000	0.036 $n=1283$	-0.079** $n=1421$

Note: n counts higher than 1427 are due to use of weights in SPSS nonparametric correlation algorithms

Figure 14: Responses to policy acceptability and willingness to sacrifice items (%; original data; $n=1427$)



Q: To what degree would you support following environmental policy measures?

8.2. Appendix to Study 3

Table 23: Differences between groups based on number of missing items in effectiveness battery (%; original data)

			no missing values	1 to 3 missing items	4 and more mis. items	Chi- square test sig.
Czech Republic <i>n</i> =1581	gender	female	68	20	12	14.418***
		male	77	16	7	
	age	18-35	75	17	8	5.754
		36-50	72	17	11	
		51-69	70	20	10	
	education	primary	64	20	16	38.212***
		lower secondary	69	19	12	
		upper secondary	74	17	8	
		tertiary	83	15	2	
United Kingdom <i>n</i> =1251	gender	female	64	14	22	7.863*
		male	72	11	17	
	age	18-35	73	9	18	22.927***
		36-50	62	12	26	
		51-69	68	16	16	
	education	primary	48	17	35	64.439***
		lower secondary	61	15	24	
		upper secondary	70	12	18	
		tertiary	79	9	12	
Poland <i>n</i> =1266	gender	female	60	24	16	21.267***
		male	69	23	8	
	age	18-35	68	20	12	16.497**
		36-50	66	20	14	
		51-69	59	30	11	
	education	primary	56	21	23	36.657***
		lower secondary	65	22	13	
		upper secondary	60	28	12	
		tertiary	76	18	6	

* sig at <0.1, ** sig. at <0.05, ***sig. at <0.01

Table 24: Differences between groups based on number of missing items in infringement battery (%; original data)

			no missing values	1 to 3 missing items	4 and more mis. items	Chi- square test sig.
Czech Republic <i>n</i> =1581	gender	female	64	22	14	24.537***
		male	73	21	6	
	age	18-35	73	20	8	19.472***
		36-50	67	19	14	
		51-69	65	26	9	
	education	primary	59	24	17	39.381***
		lower secondary	64	25	11	
		upper secondary	72	19	10	
		tertiary	78	18	3	
United Kingdom <i>n</i> =1251	gender	female	62	14	24	6.313*
		male	68	12	19	
	age	18-35	72	10	18	21.074***
		36-50	59	13	28	
		51-69	64	17	20	
	education	primary	52	15	34	50.954***
		lower secondary	58	15	27	
		upper secondary	65	13	22	
		tertiary	76	12	12	
Poland <i>n</i> =1266	gender	female	59	25	16	18.455***
		male	68	23	9	
	age	18-35	66	22	11	10.516*
		36-50	64	21	15	
		51-69	59	29	12	
	education	primary	58	23	19	18.938***
		lower secondary	63	23	14	
		upper secondary	60	28	12	
		tertiary	72	20	8	

* sig at <0.1, ** sig. at <0.05, ***sig. at <0.01

Table 25: Comparison of attitudes by groups based on number of missing items in effectiveness battery (%; original data)

all variables have min. 1 & max. 7		no missing values	1 to 3 missing items	4 and more mis. items	Kruskall-Wallis test sig.	N
Czech Republic	NEP	5.1	5.1	4.8	4.052	1168
	AC	4.9	5.1	4.9	4.139	1235
	ARI	4.5	4.6	4.9	12.987**	1538
	ARS	5.9	6.1	5.9	3.605	1550
	PN	5.7	5.8	5.5	3.538	1549
	role of gov.	4.4	4.4	4.1	2.240	1432
	trust to gov.	3.0	2.8	2.4	19.596***	1550
United Kingdom	NEP	4.7	5.0	4.9	10.571**	921
	AC	5.0	4.9	4.9	3.798	964
	ARI	4.7	4.8	4.9	2.509	1124
	ARS	5.7	6.0	5.6	6.900*	1138
	PN	5.4	5.5	5.2	3.970	1140
	role of gov.	4.1	3.9	3.6	6.154*	1087
	trust to gov.	4.3	3.7	2.6	64.154***	1187
Poland	NEP	4.6	4.8	4.6	10.383**	907
	AC	5.2	5.4	5.3	10.365**	1017
	ARI	4.7	5.1	5.1	23.107***	1208
	ARS	5.6	6.1	5.7	27.079***	1214
	PN	5.5	5.8	5.4	15.796***	1214
	role of gov.	4.8	4.5	4.9	4.264	1059
	trust to gov.	3.1	2.9	2.3	15.575***	1215

Note: Kruskal-Wallis is a non-parametric test based on mean ranks, not means. Means are reported to ease overview.

* sig at <0.1, ** sig. at <0.05, ***sig. at <0.01

Table 26: Comparison of attitudes by groups based on number of missing items in infringement battery (%; original data)

<i>all variables have min. 1 & max. 7</i>		no missing values	1 to 3 missing items	4 and more mis. items	Kruskall-Wallis test sig.	N
Czech Republic	NEP	5.0	5.2	5.1	5.368*	1168
	AC	4.9	5.1	5.1	8.773*	1235
	ARI	4.5	4.6	4.9	9.697**	1538
	ARS	5.9	6.0	6.1	7.964*	1550
	PN	5.7	5.9	5.6	5.883	1549
	role of gov.	4.4	4.4	4.2	0.993	1432
	trust to gov.	3.0	2.8	2.3	23.471***	1550
United Kingdom	NEP	4.7	4.9	4.9	7.961*	921
	AC	5.1	4.9	4.8	4.037	964
	ARI	4.7	4.7	5.0	7.627*	1124
	ARS	5.7	5.9	5.6	4.088	1138
	PN	5.4	5.6	5.1	8.710*	1140
	role of gov.	4.1	3.8	3.6	8.779*	1087
	trust to gov.	4.3	3.9	2.5	73.534***	1187
Poland	NEP	4.6	4.8	4.7	9.407**	907
	AC	5.2	5.3	5.5	8.714*	1017
	ARI	4.7	5.1	5.1	22.463***	1208
	ARS	5.7	6.0	5.8	14.667***	1214
	PN	5.5	5.7	5.6	10.502**	1214
	role of gov.	4.7	4.4	5.1	9.266**	1059
	trust to gov.	3.1	2.7	2.4	16.784***	1215

Note: Kruskal-Wallis is a non-parametric test based on mean ranks, not means. Means are reported to ease overview.

** sig at <0.1, ** sig. at <0.05, ***sig. at <0.01*

Table 27: Correlation coefficients (Kendall's τ) for perceived effectiveness of policy instruments

	Subsidies	Charges / Taxes	ETS	Harmful subsidy removal	Info provision
Czech Republic					
Technology & energy performance standards	0.398** 1328	0.393** 1311	0.194** 1225	0.375** 1275	0.307** 1326
Subsidies for energy savings		0.296** 1355	0.194** 1254	0.372** 1319	0.312** 1380
[Charges for/Taxes on] energy and emissions			0.312** 1240	0.321** 1299	0.213** 1354
Emissions trading system				0.182** 1210	0.216** 1250
Removal of environmentally harmful subsidies					0.214** 1314
Cronbach's α = 0.761					
United Kingdom					
Technology & energy performance standards	0.505** 967	0.474** 957	0.516** 901	0.519** 943	0.507** 948
Subsidies for energy savings		0.433** 974	0.473** 908	0.473** 957	0.451** 957
[Charges for/Taxes on] energy and emissions			0.466** 906	0.451** 949	0.378** 953
Emissions trading system				0.469** 891	0.510** 895
Removal of environmentally harmful subsidies					0.413** 935
Cronbach's α = 0.901					
Poland					
Technology & energy performance standards	0.506** 1040	0.448** 1015	0.302** 900	0.422** 984	0.424** 1017
Subsidies for energy savings		0.371** 1027	0.255** 909	0.426** 990	0.389** 1026
[Charges for/Taxes on] energy and emissions			0.426** 891	0.482** 977	0.371** 1004
Emissions trading system				0.356** 874	0.338** 892
Removal of environmentally harmful subsidies					0.373** 984
Cronbach's α = 0.840					

Table 28: Correlation coefficients (Kendall's τ) for perceived infringement on freedom by policy instruments

	Subsidies	Charges / Taxes	ETS	Harmful subsidy removal	Info provision
Czech Republic					
Technology & energy performance standards	0.424** 1264	0.361** 1279	0.431** 1154	0.446** 1219	0.350** 1271
Subsidies for energy savings		0.236** 1354	0.443** 1186	0.512** 1288	0.520** 1355
[Charges for/Taxes on] energy and emissions			0.219** 1196	0.246** 1287	0.106** 1357
Emissions trading system				0.498** 1156	0.426** 1194
Removal of environmentally harmful subsidies					0.440** 1283
Cronbach's α = 0.840					
United Kingdom					
Technology & energy performance standards	0.607** 923	0.464** 926	0.603** 862	0.601** 904	0.592** 913
Subsidies for energy savings		0.441** 941	0.588** 861	0.549** 919	0.623** 921
[Charges for/Taxes on] energy and emissions			0.432** 867	0.414** 921	0.349** 922
Emissions trading system				0.606** 858	0.622** 865
Removal of environmentally harmful subsidies					0.554** 910
Cronbach's α = 0.918					
Poland					
Technology & energy performance standards	0.562** 999	0.418** 1006	0.413** 881	0.507** 959	0.466** 1001
Subsidies for energy savings		0.348** 1015	0.422** 891	0.573** 964	0.604** 1004
[Charges for/Taxes on] energy and emissions			0.375** 889	0.417** 970	0.269** 1010
Emissions trading system				0.518** 866	0.447** 886
Removal of environmentally harmful subsidies					0.511** 975
Cronbach's α = 0.889					

Table 29: Non-parametric correlations (Kendall's τ) between perceived effectiveness and independent variables (%; original data)

	PN	ARI	ARGov	NEP	AC	altr	bio	ego	trust gov	trust inter. inst.	gov. responsibility to provide a	private enterprise to solve econ.	public services in state ownership	not gov.'s role to redistribute income	age	income
Czech Republic																
Technology & energy performance	0.196** 1346	-0.060** 1341	0.239** 1348	0.155** 1069	0.133** 1117	0.139** 1352	0.159** 1352	0.049* 1352	0.063** 1332	0.092** 1291	0.009 1325	0.030 1225	0.109** 1275	-0.026 1271	0.075** 1352	0.078** 1210
Subsidies for energy savings	0.195** 1411	-0.028 1402	0.185** 1413	0.144** 1106	0.151** 1106	0.135** 1420	0.147** 1420	-0.001 1420	0.056** 1398	0.052* 1348	0.042 1384	0.033 1278	0.105** 1336	-0.015 1324	0.048* 1420	0.046* 1268
[Charges for/Taxes on] energy and emissions	0.166** 1380	-0.033 1371	0.204** 1381	0.105** 1084	0.153** 1136	0.093** 1386	0.121** 1386	0.068** 1386	0.038 1365	0.105** 1318	0.033 1353	0.045* 1250	0.048* 1302	0.015 1299	0.015 1386	0.064** 1241
Emissions trading system	0.080** 1266	0.042* 1261	0.113** 1267	0.051* 1024	0.085** 1053	0.060** 1273	0.080** 1273	0.067** 1273	0.092** 1258	0.126** 1217	0.045* 1247	0.039 1161	0.012 1210	-0.009 1202	-0.009 1273	0.019 1146
Removal of environmentally	0.182** 1336	-0.029 1330	0.166** 1339	0.123** 1071	0.104** 1109	0.128** 1343	0.130** 1343	-0.010 1343	0.017 1323	0.049* 1280	-0.006 1312	0.057* 1217	0.057** 1267	0.050* 1264	0.038 1343	0.045* 1208
Information provision	0.150** 1406	-0.009 1397	0.155** 1408	0.063** 1100	0.103** 1151	0.128** 1415	0.150** 1415	0.070** 1415	0.079** 1395	0.114** 1351	0.040 1383	0.052* 1277	0.043* 1333	-0.024 1325	0.045* 1415	-0.018 1266
United Kingdom																
Technology & energy performance	0.294** 970	-0.001 965	0.285** 972	0.100** 832	0.275** 858	0.190** 982	0.231** 982	0.171** 982	0.199** 964	0.240** 944	0.132** 953	0.143** 898	0.128** 894	0.078** 936	-0.055* 982	0.057* 901
Subsidies for energy savings	0.259** 994	-0.011 986	0.274** 996	0.094** 838	0.240** 868	0.173** 1006	0.162** 1006	0.138** 1006	0.215** 986	0.240** 962	0.109** 979	0.088** 916	0.113** 915	0.058* 961	-0.041 1006	0.015 926
[Charges for/Taxes on] energy and emissions	0.265** 984	0.022 979	0.277** 986	0.120** 838	0.274** 855	0.158** 996	0.170** 996	0.087** 996	0.149** 975	0.196** 955	0.142** 966	0.112** 906	0.159** 907	0.020 949	-0.039 996	-0.016 917
Emissions trading system	0.211** 908	0.048 901	0.188** 909	0.003 795	0.248** 810	0.121** 919	0.170** 919	0.200** 919	0.221** 901	0.254** 880	0.180** 892	0.203** 845	0.125** 841	0.143** 879	-0.147** 919	-0.008 848
Removal of environmentally	0.249** 961	0.019 954	0.225** 962	0.102** 820	0.281** 844	0.131** 972	0.180** 972	0.134** 972	0.192** 952	0.214** 930	0.111** 943	0.148** 888	0.112** 887	0.056* 927	-0.076** 972	-0.011 895
Information provision	0.216** 963	0.051* 957	0.204** 965	0.001 822	0.270** 847	0.183** 975	0.201** 975	0.217** 975	0.232** 955	0.260** 934	0.202** 946	0.134** 889	0.144** 889	0.138** 930	-0.065** 975	-0.005 896
Poland																
Technology & energy performance	0.306** 1067	0.063** 1064	0.344** 1068	0.212** 819	0.241** 915	0.176** 1074	0.168** 1074	0.033 1074	0.089** 1051	0.165** 1009	0.180** 1056	0.071** 983	0.125** 1002	0.118** 950	0.114** 1074	0.101** 889
Subsidies for energy savings	0.291** 1089	0.062** 1084	0.342** 1089	0.185** 830	0.202** 936	0.174** 1095	0.149** 1095	0.018 1095	0.056* 1069	0.142** 1028	0.207** 1077	0.118** 997	0.177** 1017	0.112** 962	0.101** 1095	0.083** 908
[Charges for/Taxes on] energy and emissions	0.234** 1057	0.080** 1053	0.308** 1058	0.131** 817	0.209** 910	0.123** 1063	0.120** 1063	0.074** 1063	0.098** 1040	0.157** 997	0.174** 1047	0.091** 974	0.120** 995	0.120** 942	0.102** 1063	0.069** 886
Emissions trading system	0.130** 925	0.048 922	0.169** 925	-0.025 739	0.123** 815	0.026 931	0.032 931	0.096** 931	0.107** 915	0.108** 894	0.085** 918	0.098** 868	0.021 881	0.192** 850	-0.022 931	0.031 792
Removal of environmentally	0.231** 1018	0.065** 1015	0.289** 1018	0.171** 805	0.186** 883	0.128** 1024	0.131** 1024	0.007 1024	0.039 1000	0.100** 965	0.169** 1005	0.052* 938	0.100** 959	0.111** 915	0.096** 1024	0.070** 852
Information provision	0.225** 1057	0.031 1054	0.233** 1057	0.138** 821	0.201** 909	0.138** 1065	0.165** 1065	0.093** 1065	0.114** 1038	0.184** 1002	0.170** 1050	0.098** 971	0.079** 990	0.140** 943	0.080** 1065	0.051* 884

ajTable 30: Non-parametric correlations (Kendall's τ) between perceived coerciveness and independent variables (%; original data)

	PN	ARI	ARGov	NEP	AC	altr	bio	ego	trust gov	trust inter. inst.	gov. responsibility to provide a job	private enterprise to solve econ. problems	public services in state ownership	not gov.'s role to redistribute income	age	income
Czech Republic																
Technology & energy performance standards	-0.087** 1300	0.022 1294	-0.113** 1299	-0.092** 1043	0.007 1075	-0.042* 1305	-0.007 1305	0.059** 1305	0.035 1288	0.036 1248	0.055* 1276	0.037 1184	0.013 1232	0.007 1230	-0.002 1305	0.000 1177
Subsidies for energy savings	-0.121** 1391	0.113** 1382	-0.089** 1392	-0.148** 1084	-0.023 1144	-0.038 1398	-0.010 1398	0.037 1398	0.034 1376	0.026 1329	0.059** 1364	0.047* 1255	0.036 1313	0.045* 1304	0.039* 1398	-0.072 1247
[Charges for/Taxes on] energy and emissions	-0.022 1400	0.050* 1393	-0.007 1401	0.024 1088	0.060** 1145	0.051* 1409	0.030 1409	0.011 1409	-0.033 1391	-0.011 1342	0.058** 1375	-0.029 1262	0.070** 1318	-0.030 1314	0.031 1409	-0.038 1264
Emissions trading system	-0.113** 1209	0.051* 1206	-0.105** 1209	-0.149** 987	-0.016 1012	-0.018 1216	0.001 1216	0.073** 1216	0.024 1202	0.027 1164	0.102** 1190	0.051* 1105	0.008 1154	0.001 1149	-0.012 1216	-0.054* 1095
Removal of environmentally harmful	-0.073** 1311	0.062** 1305	-0.059** 1312	-0.122** 1045	0.017 1095	-0.002 1318	0.023 1318	0.077** 1318	0.062** 1301	0.035 1260	0.082** 1291	0.080** 1194	0.029 1246	0.006 1237	0.039 1318	-0.056* 1183
Information provision	-0.110** 1405	0.083** 1396	-0.114** 1406	-0.161** 1088	-0.035 1149	-0.055** 1414	-0.013 1414	0.069** 1414	0.039 1393	0.011 1347	0.042* 1378	0.036 1270	0.016 1324	-0.004 1318	0.018 1414	-0.053* 1267
United Kingdom																
Technology & energy performance standards	-0.056* 934	0.157** 929	-0.085** 937	-0.205** 808	0.110** 827	-0.013 948	0.021 948	0.249** 948	0.152** 933	0.114** 913	0.142** 917	0.214** 868	0.074** 866	0.198** 901	-0.095** 948	-0.014 874
Subsidies for energy savings	-0.057* 959	0.140** 953	-0.088** 962	-0.196** 817	0.103** 847	-0.035 972	0.018 972	0.242** 972	0.146** 954	0.110** 932	0.134** 941	0.231** 890	0.026 888	0.201** 925	-0.044 972	-0.013 894
[Charges for/Taxes on] energy and emissions	-0.003 970	0.198** 964	-0.007 973	-0.100** 824	0.072** 842	0.040 982	0.074** 982	0.199** 982	0.057* 961	0.021 939	0.118** 950	0.168** 886	0.054* 891	0.116** 930	0.032 982	0.002 902
Emissions trading system	-0.046 870	0.172** 865	-0.106** 873	-0.224** 770	0.126** 781	-0.008 883	0.062* 883	0.263** 883	0.157** 866	0.122** 848	0.137** 857	0.243** 811	0.045 807	0.253** 839	-0.089** 883	-0.014 811
Removal of environmentally harmful	-0.086** 928	0.159** 924	-0.134** 931	-0.236** 796	0.088** 822	-0.053* 941	-0.005 941	0.260** 941	0.178** 923	0.146** 901	0.119** 910	0.219** 863	0.032 861	0.237** 895	-0.069** 941	0.035 869
Information provision	-0.047 938	0.154** 932	-0.087** 941	-0.226** 802	0.118** 830	-0.051* 951	0.033 951	0.266** 951	0.193** 932	0.170** 913	0.180** 923	0.235** 870	0.043 868	0.231** 905	-0.128** 951	-0.018 876
Poland																
Technology & energy performance standards	0.013 1040	0.101** 1037	0.027 1040	-0.096** 808	0.036 900	-0.003 1048	0.003 1048	0.098** 1048	0.095** 1024	0.074** 986	0.101** 1032	0.079** 965	0.064** 984	0.042 932	-0.095** 948	-0.025 875
Subsidies for energy savings	-0.053* 1058	0.118** 1055	-0.014 1058	-0.137** 815	0.013 914	-0.023 1067	-0.013 1067	0.114** 1067	0.079** 1042	0.064** 1007	0.101** 1044	0.045 968	-0.004 989	0.040 936	-0.044 972	-0.018 889
[Charges for/Taxes on] energy and emissions	0.030 1065	0.077** 1063	0.033 1066	-0.028 822	0.030 913	0.060** 1073	0.034 1073	0.062** 1073	0.012 1051	0.022 1010	0.133** 1052	0.061* 978	0.088** 1003	0.021 947	0.032 982	-0.006 904
Emissions trading system	-0.100** 917	0.054* 916	-0.096** 916	-0.160** 739	-0.041 808	-0.061* 924	-0.038 924	0.097** 924	0.061* 904	0.024 887	0.029 910	0.018 860	-0.030 869	0.067* 836	-0.089** 883	-0.072** 777
Removal of environmentally harmful	-0.025 1011	0.066** 1006	-0.008 1009	-0.117** 799	0.047 878	-0.028 1017	-0.010 1017	0.104** 1017	0.081** 991	0.087** 961	0.043 995	0.043 932	0.009 952	0.028 907	-0.069** 941	0.007 850
Information provision	-0.063** 1058	0.082** 1056	-0.085** 1057	-0.193** 820	-0.059* 905	-0.108** 1067	-0.020 1067	0.202** 1067	0.131** 1037	0.094** 999	0.016 1047	0.112** 972	-0.004 993	0.042 942	-0.128** 951	-0.048 887

Table 31: MNL regression results for perceived effectiveness in the Czech Republic (imputed data)

		Czech Republic																	
		Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
		B	td. Errd	Sig.	B	td. Errd	Sig.	B	td. Errd	Sig.	B	td. Errd	Sig.	B	td. Errd	Sig.	B	td. Errd	Sig.
Unlikely	Const.	-0,801	1,575	0,611	-1,254	1,282	0,328	1,199	1,160	0,302	0,149	0,922	0,872	-2,050	1,156	0,076	-1,587	1,083	0,143
	Age	-0,012	0,012	0,330	0,013	0,010	0,158	-0,004	0,009	0,628	0,002	0,007	0,780	0,012	0,008	0,141	0,004	0,008	0,634
	Income	0,000	0,000	0,239	0,000	0,000	0,014	0,000	0,000	0,632	0,000	0,000	0,417	0,000	0,000	0,313	0,000	0,000	0,950
	Altruistic	-0,201	0,129	0,120	0,125	0,109	0,252	0,011	0,098	0,913	0,127	0,078	0,101	-0,010	0,096	0,921	0,005	0,089	0,956
	Biospheric	0,033	0,128	0,795	0,019	0,101	0,854	-0,076	0,097	0,429	-0,020	0,074	0,789	0,017	0,093	0,859	0,000	0,086	0,998
	Egoistic	-0,137	0,119	0,250	-0,151	0,094	0,107	-0,133	0,088	0,130	-0,087	0,066	0,187	-0,032	0,084	0,699	0,026	0,077	0,731
	NEP	0,379	0,251	0,131	0,192	0,202	0,341	0,361	0,192	0,061	0,271	0,146	0,064	0,174	0,187	0,353	0,240	0,171	0,160
	AC	-0,124	0,137	0,367	-0,102	0,108	0,341	-0,316	0,097	0,001	-0,105	0,077	0,177	-0,107	0,098	0,276	-0,132	0,091	0,147
	Trust G	-0,196	0,130	0,130	-0,194	0,087	0,026	-0,232	0,081	0,004	-0,087	0,057	0,122	0,030	0,073	0,677	-0,126	0,070	0,070
	Trust Int	-0,281	0,111	0,012	-0,112	0,076	0,140	-0,096	0,070	0,175	-0,152	0,052	0,003	-0,184	0,069	0,007	-0,117	0,063	0,062
	ARI	0,042	0,120	0,727	0,086	0,092	0,347	-0,038	0,084	0,651	-0,018	0,063	0,772	-0,037	0,080	0,648	0,161	0,077	0,036
	ARS	-0,234	0,161	0,147	-0,012	0,124	0,921	-0,136	0,116	0,241	-0,084	0,094	0,370	-0,118	0,117	0,313	-0,241	0,104	0,021
	PN	0,033	0,162	0,839	-0,399	0,119	0,001	-0,042	0,119	0,723	0,025	0,095	0,792	0,031	0,117	0,791	0,011	0,106	0,915
	State1	0,259	0,110	0,019	0,068	0,076	0,368	0,059	0,071	0,399	-0,096	0,052	0,066	0,148	0,072	0,040	0,043	0,063	0,498
	State2	0,007	0,086	0,936	-0,025	0,069	0,717	-0,048	0,063	0,453	-0,064	0,048	0,182	-0,006	0,061	0,928	-0,004	0,057	0,943
	Male=1	-0,407	0,349	0,244	-0,696	0,275	0,012	-0,614	0,251	0,015	-0,729	0,192	0,000	-0,378	0,243	0,120	-0,267	0,223	0,231
	Education lower secondary	-1,114	0,689	0,106	0,275	0,548	0,615	-1,042	0,512	0,042	-0,203	0,335	0,544	-0,207	0,453	0,647	0,763	0,405	0,060
	Education upper secondary	-0,528	0,483	0,275	0,364	0,480	0,447	-0,467	0,384	0,223	-0,371	0,302	0,219	-0,414	0,393	0,292	0,055	0,381	0,886
	Education tertiary	-0,494	0,490	0,314	0,394	0,467	0,399	-0,090	0,376	0,811	-0,358	0,304	0,240	0,111	0,374	0,768	-0,046	0,388	0,905
Likely	Const.	-6,079	0,752	0,000	-4,066	0,693	0,000	-4,104	0,719	0,000	-3,484	0,781	0,000	-4,919	0,735	0,000	-3,547	0,715	0,000
	Age	0,005	0,005	0,314	0,006	0,005	0,176	0,003	0,005	0,479	0,000	0,005	0,949	0,004	0,005	0,401	0,005	0,005	0,321
	Income	0,000	0,000	0,062	0,000	0,000	0,197	0,000	0,000	0,010	0,000	0,000	0,215	0,000	0,000	0,212	0,000	0,000	0,471
	Altruistic	0,065	0,058	0,260	0,158	0,056	0,005	0,013	0,057	0,814	0,048	0,064	0,459	0,160	0,059	0,006	0,038	0,058	0,512
	Biospheric	0,090	0,055	0,102	0,107	0,054	0,045	0,051	0,056	0,356	0,133	0,062	0,032	0,028	0,056	0,616	0,157	0,056	0,005
	Egoistic	0,079	0,049	0,106	-0,052	0,047	0,266	0,040	0,048	0,405	0,003	0,053	0,959	-0,046	0,048	0,342	0,076	0,048	0,114
	NEP	0,404	0,106	0,000	0,202	0,102	0,047	0,147	0,104	0,159	0,094	0,116	0,420	0,197	0,107	0,065	0,029	0,106	0,783
	AC	0,053	0,059	0,368	0,100	0,057	0,079	0,106	0,059	0,072	0,133	0,066	0,044	0,053	0,060	0,379	0,027	0,059	0,649
	Trust G	0,037	0,039	0,339	0,053	0,038	0,159	-0,053	0,038	0,164	0,040	0,042	0,333	0,026	0,039	0,506	0,037	0,038	0,324
	Trust Int	0,031	0,037	0,397	-0,024	0,036	0,499	0,070	0,036	0,053	0,007	0,040	0,860	-0,023	0,037	0,528	0,040	0,036	0,269
	ARI	-0,019	0,045	0,670	-0,023	0,045	0,607	-0,026	0,045	0,560	0,107	0,050	0,034	-0,009	0,046	0,837	0,000	0,045	0,994
	ARS	0,364	0,079	0,000	0,139	0,073	0,056	0,351	0,080	0,000	0,217	0,088	0,014	0,195	0,080	0,014	0,191	0,080	0,017
	PN	0,013	0,073	0,856	0,032	0,073	0,654	-0,043	0,073	0,560	-0,097	0,080	0,228	0,137	0,075	0,068	0,055	0,075	0,461
	State1	-0,072	0,039	0,062	-0,012	0,038	0,758	-0,040	0,038	0,292	-0,071	0,043	0,097	-0,040	0,039	0,304	-0,028	0,039	0,460
	State2	0,003	0,036	0,941	0,004	0,035	0,910	0,027	0,035	0,453	-0,043	0,039	0,278	0,083	0,036	0,022	-0,016	0,036	0,649
	Male=1	-0,445	0,137	0,001	-0,447	0,133	0,001	-0,018	0,134	0,896	-0,006	0,151	0,969	-0,172	0,138	0,211	-0,133	0,135	0,325
	Education lower secondary	0,317	0,249	0,202	0,423	0,240	0,078	-0,099	0,245	0,688	-0,648	0,278	0,020	0,155	0,251	0,538	-0,295	0,245	0,229
	Education upper secondary	0,199	0,223	0,371	0,416	0,211	0,048	-0,171	0,218	0,432	-0,278	0,238	0,243	0,092	0,221	0,677	-0,351	0,213	0,099
	Education tertiary	0,216	0,231	0,349	0,079	0,217	0,715	-0,108	0,226	0,633	-0,274	0,247	0,267	0,214	0,229	0,350	-0,143	0,218	0,511
n		1210			1268			1241			1146			1208			1266		
Nagelkerke		0,208			0,166			0,152			0,120			0,127			0,120		

Table 32: MNL regression results for perceived effectiveness in the United Kingdom (imputed data)

		United Kingdom														
		Tech standards			Subsidies energy			Taxes			ETS			Remove harmful		
		B	td. Errc	Sig.	B	td. Errc	Sig.	B	td. Errc	Sig.	B	td. Errc	Sig.	B	td. Errc	Sig.
Unlikely	Const.	2,073	1,462	0,156	1,479	1,415	0,296	-0,723	1,411	0,609	-0,492	1,164	0,673	-0,635	1,318	0,630
	Age	0,011	0,012	0,360	0,038	0,012	0,002	0,034	0,012	0,003	0,037	0,010	0,000	0,034	0,011	0,002
	Income	0,000	0,000	0,036	0,000	0,000	0,573	0,000	0,000	0,284	0,000	0,000	0,801	0,000	0,000	0,307
	Altruistic	-0,037	0,128	0,774	-0,146	0,127	0,251	0,032	0,127	0,799	0,281	0,108	0,009	0,127	0,122	0,297
	Biospheric	0,208	0,137	0,129	0,262	0,131	0,045	0,326	0,134	0,015	-0,085	0,110	0,439	0,058	0,124	0,640
	Egoistic	-0,379	0,125	0,002	-0,101	0,119	0,395	-0,131	0,116	0,256	-0,186	0,097	0,054	-0,113	0,112	0,314
	NEP	0,179	0,250	0,473	-0,273	0,244	0,263	-0,104	0,236	0,660	0,455	0,200	0,023	0,336	0,227	0,138
	AC	-0,102	0,147	0,489	-0,042	0,139	0,764	-0,079	0,137	0,561	-0,085	0,116	0,463	-0,345	0,132	0,009
	Trust G	-0,049	0,093	0,599	-0,218	0,091	0,017	-0,051	0,086	0,553	-0,059	0,069	0,387	-0,104	0,082	0,205
	Trust Int	-0,206	0,092	0,026	-0,151	0,087	0,083	-0,217	0,086	0,012	-0,199	0,070	0,004	-0,154	0,083	0,063
	ARI	0,062	0,118	0,598	0,058	0,113	0,609	0,116	0,109	0,289	0,019	0,086	0,823	0,121	0,107	0,258
	ARS	-0,113	0,166	0,496	-0,120	0,160	0,453	-0,048	0,161	0,767	-0,154	0,141	0,276	-0,134	0,156	0,389
	PN	-0,650	0,159	0,000	-0,397	0,150	0,008	-0,516	0,155	0,001	-0,398	0,138	0,004	-0,463	0,150	0,002
	State1	0,091	0,098	0,351	-0,002	0,092	0,986	0,044	0,093	0,640	-0,116	0,073	0,111	0,014	0,090	0,878
	State2	-0,050	0,087	0,565	-0,174	0,084	0,039	-0,107	0,083	0,197	-0,107	0,068	0,117	-0,018	0,081	0,827
	Male=1	-0,377	0,328	0,249	-0,127	0,316	0,687	0,000	0,308	0,999	-0,441	0,252	0,080	-0,130	0,291	0,654
	Education lower secondary	-0,847	0,525	0,107	0,034	0,543	0,950	-0,053	0,527	0,920	-0,252	0,439	0,566	-0,392	0,529	0,459
Likely	Education upper secondary	-0,783	0,538	0,145	-0,070	0,558	0,900	0,087	0,517	0,866	-0,219	0,451	0,627	0,304	0,507	0,549
	Education tertiary	-0,627	0,484	0,195	0,318	0,498	0,523	-0,637	0,513	0,215	-0,181	0,425	0,669	0,092	0,470	0,845
	Const.	-4,514	0,846	0,000	-4,162	0,815	0,000	-5,356	0,833	0,000	-5,224	0,941	0,000	-5,076	0,849	0,000
	Age	-0,005	0,006	0,370	0,001	0,006	0,847	0,004	0,006	0,466	-0,011	0,006	0,076	0,002	0,006	0,756
	Income	0,000	0,000	0,012	0,000	0,000	0,563	0,000	0,000	0,703	0,000	0,000	0,150	0,000	0,000	0,512
	Altruistic	-0,060	0,077	0,435	0,149	0,074	0,043	0,048	0,074	0,515	-0,066	0,085	0,440	0,002	0,078	0,977
	Biospheric	0,113	0,076	0,138	-0,062	0,073	0,400	0,017	0,074	0,823	0,122	0,084	0,144	0,092	0,078	0,237
	Egoistic	0,044	0,064	0,486	0,052	0,062	0,402	-0,012	0,063	0,843	0,034	0,069	0,623	-0,009	0,064	0,894
	NEP	-0,079	0,133	0,554	-0,171	0,129	0,188	0,021	0,130	0,868	-0,169	0,145	0,244	-0,071	0,134	0,596
	AC	0,224	0,084	0,008	0,096	0,081	0,236	0,286	0,083	0,001	0,317	0,095	0,001	0,310	0,087	0,000
	Trust G	0,101	0,046	0,028	0,104	0,044	0,018	0,129	0,045	0,004	0,137	0,050	0,006	0,106	0,045	0,020
	Trust Int	0,036	0,047	0,441	0,049	0,045	0,275	-0,018	0,045	0,696	-0,014	0,051	0,788	0,042	0,046	0,368
	ARI	-0,058	0,059	0,329	-0,038	0,057	0,498	0,124	0,057	0,030	0,144	0,064	0,024	0,115	0,058	0,048
	ARS	0,280	0,111	0,012	0,401	0,109	0,000	0,175	0,108	0,103	0,244	0,127	0,055	0,100	0,112	0,375
	PN	0,176	0,102	0,085	0,129	0,098	0,186	0,176	0,100	0,079	0,106	0,115	0,360	0,237	0,105	0,024
	State1	0,095	0,053	0,071	0,026	0,051	0,603	0,100	0,052	0,053	0,160	0,060	0,008	-0,024	0,053	0,648
	State2	0,020	0,047	0,667	0,006	0,045	0,896	-0,031	0,045	0,488	0,060	0,051	0,238	0,023	0,047	0,617
	Male=1	-0,166	0,153	0,279	0,030	0,148	0,838	0,100	0,151	0,508	-0,113	0,168	0,503	0,077	0,153	0,617
	Education lower secondary	-0,016	0,288	0,955	-0,229	0,271	0,397	0,106	0,276	0,701	-0,557	0,310	0,072	0,053	0,287	0,855
	Education upper secondary	-0,173	0,294	0,556	-0,014	0,278	0,961	-0,435	0,285	0,127	-0,387	0,317	0,223	-0,092	0,296	0,755
	Education tertiary	-0,201	0,287	0,484	-0,021	0,272	0,938	-0,447	0,277	0,106	-0,483	0,314	0,124	-0,255	0,291	0,382
n		901			926			917			848			895		
Nagelkerke		0,325			0,280			0,283			0,336			0,299		

Table 33: MNL regression results for perceived effectiveness in Poland (imputed data)

		Poland																	
		Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
		B	td. Errc	Sig.	B	td. Errc	Sig.	B	td. Errc	Sig.	B	td. Errc	Sig.	B	td. Errc	Sig.	B	td. Errc	Sig.
Unlikely	Const.	-1,579	2,293	0,491	-2,745	1,884	0,145	0,396	1,349	0,769	-3,263	1,137	0,004	-1,623	1,385	0,241	-0,499	1,420	0,725
	Age	0,015	0,018	0,398	0,006	0,016	0,722	-0,001	0,011	0,940	0,013	0,009	0,126	-0,008	0,011	0,469	-0,014	0,012	0,245
	Income	0,000	0,000	0,446	0,000	0,000	0,298	0,000	0,000	0,871	0,000	0,000	0,816	0,000	0,000	0,348	0,000	0,000	0,077
	Altruistic	0,305	0,221	0,167	0,194	0,178	0,276	0,079	0,133	0,555	0,183	0,111	0,101	0,282	0,138	0,041	0,176	0,137	0,200
	Biospheric	-0,135	0,201	0,502	-0,128	0,173	0,460	0,078	0,131	0,554	0,098	0,113	0,383	-0,011	0,127	0,931	-0,062	0,138	0,651
	Egoistic	0,175	0,173	0,311	0,106	0,151	0,484	0,087	0,109	0,423	-0,083	0,086	0,338	0,037	0,106	0,726	-0,128	0,120	0,284
	NEP	0,163	0,388	0,675	0,745	0,350	0,034	0,041	0,248	0,868	0,475	0,202	0,019	0,392	0,244	0,108	0,343	0,263	0,193
	AC	-0,555	0,192	0,004	-0,291	0,172	0,091	-0,334	0,124	0,007	-0,218	0,102	0,033	-0,244	0,126	0,053	-0,348	0,141	0,014
	Trust G	-0,169	0,153	0,270	-0,064	0,131	0,623	-0,222	0,097	0,022	0,005	0,067	0,940	-0,115	0,094	0,221	0,149	0,104	0,151
	Trust Int	0,018	0,137	0,897	-0,110	0,120	0,360	-0,103	0,083	0,217	-0,067	0,065	0,303	-0,087	0,083	0,290	-0,302	0,101	0,003
	ARI	0,246	0,173	0,157	0,229	0,148	0,122	0,282	0,115	0,014	0,234	0,086	0,006	0,122	0,107	0,256	0,269	0,121	0,026
	ARS	-0,834	0,288	0,004	-0,579	0,233	0,013	-0,537	0,179	0,003	-0,347	0,149	0,020	-0,416	0,180	0,021	-0,352	0,188	0,061
	PN	0,407	0,266	0,126	0,067	0,219	0,760	0,268	0,179	0,134	0,271	0,147	0,065	0,257	0,178	0,149	0,122	0,186	0,514
	State1	-0,106	0,136	0,434	-0,180	0,119	0,132	-0,178	0,092	0,054	0,032	0,080	0,685	-0,029	0,096	0,764	0,003	0,100	0,980
	State2	-0,219	0,139	0,116	0,016	0,115	0,889	0,168	0,092	0,069	-0,139	0,066	0,036	-0,099	0,085	0,244	-0,059	0,093	0,524
	Male=1	0,620	0,505	0,219	-0,613	0,441	0,165	-0,046	0,307	0,881	-0,193	0,239	0,419	-0,107	0,306	0,725	-0,205	0,334	0,540
	Education lower secondary	0,719	1,200	0,549	0,277	0,900	0,758	-0,770	0,539	0,153	-0,962	0,454	0,034	-0,452	0,554	0,415	-0,349	0,627	0,578
	Education upper secondary	0,564	1,171	0,630	0,268	0,860	0,755	-1,081	0,503	0,032	-1,082	0,418	0,010	-0,445	0,519	0,392	-0,395	0,575	0,492
	Education tertiary	0,881	1,167	0,450	-0,058	0,902	0,949	-1,340	0,535	0,012	-1,308	0,426	0,002	-0,957	0,550	0,082	-0,811	0,612	0,185
Likely	Const.	-5,462	0,806	0,000	-4,750	0,810	0,000	-4,328	0,797	0,000	-3,113	0,842	0,000	-4,381	0,789	0,000	-4,886	0,802	0,000
	Age	-0,001	0,006	0,803	-0,002	0,006	0,774	0,006	0,006	0,261	-0,009	0,006	0,151	0,004	0,006	0,433	-0,007	0,006	0,212
	Income	0,000	0,000	0,297	0,000	0,000	0,104	0,000	0,000	0,052	0,000	0,000	0,091	0,000	0,000	0,303	0,000	0,000	0,429
	Altruistic	0,223	0,074	0,003	0,183	0,074	0,013	0,174	0,074	0,018	0,080	0,077	0,299	0,103	0,073	0,160	0,177	0,074	0,017
	Biospheric	-0,049	0,074	0,510	-0,040	0,074	0,588	-0,005	0,072	0,941	-0,040	0,079	0,616	0,098	0,073	0,176	0,171	0,072	0,018
	Egoistic	-0,027	0,058	0,640	-0,021	0,060	0,724	-0,001	0,056	0,986	0,085	0,063	0,178	-0,073	0,057	0,201	0,027	0,057	0,637
	NEP	0,167	0,139	0,229	-0,069	0,144	0,630	-0,185	0,135	0,171	-0,228	0,149	0,124	0,078	0,137	0,570	-0,199	0,137	0,147
	AC	0,140	0,075	0,063	0,077	0,076	0,314	0,209	0,075	0,005	0,215	0,083	0,009	0,135	0,075	0,073	0,167	0,076	0,028
	Trust G	0,020	0,042	0,639	0,037	0,043	0,390	0,017	0,040	0,664	0,086	0,043	0,047	-0,024	0,042	0,569	0,102	0,041	0,013
	Trust Int	0,053	0,042	0,213	0,019	0,044	0,658	0,020	0,041	0,633	-0,052	0,045	0,248	0,027	0,042	0,518	0,001	0,042	0,987
	ARI	0,011	0,061	0,857	0,022	0,063	0,724	0,052	0,057	0,367	-0,062	0,065	0,338	0,161	0,060	0,007	-0,044	0,059	0,452
	ARS	0,363	0,106	0,001	0,532	0,107	0,000	0,261	0,107	0,015	0,173	0,115	0,131	0,269	0,106	0,012	0,296	0,108	0,006
	PN	0,170	0,095	0,076	0,115	0,096	0,229	0,111	0,095	0,244	0,170	0,104	0,103	0,072	0,096	0,454	0,075	0,095	0,429
	State1	-0,005	0,057	0,924	0,001	0,059	0,985	0,072	0,058	0,212	0,114	0,063	0,069	-0,016	0,057	0,781	0,087	0,058	0,133
	State2	0,037	0,049	0,449	0,071	0,049	0,146	0,069	0,046	0,136	0,107	0,051	0,037	-0,002	0,049	0,967	0,113	0,048	0,018
	Male=1	-0,266	0,159	0,094	-0,148	0,161	0,357	-0,086	0,154	0,575	-0,151	0,166	0,365	-0,216	0,159	0,174	-0,067	0,155	0,666
	Education lower secondary	-0,129	0,321	0,688	0,087	0,319	0,785	-0,486	0,329	0,140	-0,340	0,349	0,329	-0,516	0,333	0,122	0,023	0,326	0,944
	Education upper secondary	-0,192	0,295	0,516	0,110	0,291	0,706	-0,647	0,304	0,033	-0,541	0,324	0,095	-0,193	0,309	0,532	-0,348	0,300	0,246
	Education tertiary	0,070	0,296	0,814	0,322	0,293	0,272	-0,678	0,304	0,026	-0,279	0,319	0,382	-0,207	0,308	0,502	-0,167	0,300	0,579
n		889			908			886			792			852			884		
Nagelkerke		0,303			0,277			0,267			0,191			0,217			0,264		

Table 34: MNL regression results for perceived coerciveness in the Czech Republic (imputed data)

		Czech Republic														
		Tech standards			Subsidies energy			Taxes			ETS			Remove harmful		
		B	Std. Err.	Sig.	B	Std. Err.	Sig.	B	Std. Err.	Sig.	B	Std. Err.	Sig.	B	Std. Err.	Sig.
Not Infringes	Const.	-4,322	0,837	0,000	-3,285	0,726	0,000	-4,054	1,051	0,000	-2,739	0,738	0,000	-3,799	0,746	0,000
	Age	0,003	0,006	0,597	-0,002	0,005	0,744	0,012	0,007	0,100	0,006	0,005	0,276	0,005	0,005	0,788
	Income	0,000	0,000	0,489	0,000	0,000	0,028	0,000	0,000	0,175	0,000	0,000	0,244	0,000	0,000	0,109
	Altruistic	0,040	0,066	0,540	0,097	0,059	0,098	0,005	0,082	0,952	0,071	0,061	0,250	0,091	0,060	0,035
	Biospheric	-0,105	0,064	0,100	-0,064	0,057	0,263	-0,118	0,082	0,147	-0,063	0,059	0,281	-0,082	0,058	0,303
	Egoistic	-0,002	0,056	0,977	0,049	0,050	0,321	-0,004	0,072	0,956	-0,017	0,052	0,749	-0,058	0,051	0,605
	NEP	0,468	0,124	0,000	0,459	0,110	0,000	0,277	0,155	0,074	0,608	0,115	0,000	0,614	0,114	0,000
	AC	-0,136	0,067	0,042	-0,114	0,061	0,060	-0,081	0,084	0,335	-0,142	0,064	0,026	-0,136	0,063	0,000
	Trust G	0,017	0,044	0,693	-0,050	0,040	0,211	-0,033	0,058	0,562	-0,024	0,040	0,557	-0,105	0,042	0,011
	Trust Int	-0,074	0,042	0,078	-0,061	0,037	0,102	-0,106	0,054	0,049	-0,038	0,038	0,321	0,007	0,039	0,861
	ARI	0,047	0,052	0,364	-0,084	0,047	0,071	0,059	0,066	0,372	-0,026	0,048	0,598	0,024	0,047	0,603
	ARS	0,274	0,095	0,004	0,148	0,077	0,054	0,148	0,114	0,195	0,148	0,078	0,057	0,109	0,078	0,161
	PN	0,087	0,087	0,315	0,181	0,076	0,018	0,115	0,112	0,307	0,090	0,076	0,238	0,060	0,077	0,439
	State1	-0,107	0,043	0,013	-0,056	0,040	0,159	0,033	0,055	0,554	-0,161	0,042	0,000	-0,077	0,040	0,056
	State2	-0,015	0,041	0,710	-0,051	0,037	0,167	-0,009	0,052	0,866	-0,067	0,039	0,085	-0,021	0,038	0,576
	Male=1	0,122	0,157	0,438	-0,395	0,141	0,005	-0,019	0,200	0,924	-0,144	0,145	0,324	0,066	0,143	0,645
	Education lower secondary	0,228	0,287	0,427	0,394	0,252	0,118	-0,221	0,374	0,554	0,268	0,264	0,309	0,814	0,265	0,002
	Education upper secondary	0,157	0,259	0,544	0,255	0,226	0,260	0,017	0,324	0,958	-0,016	0,236	0,945	0,597	0,240	0,013
	Education tertiary	0,184	0,268	0,492	-0,111	0,236	0,638	0,009	0,332	0,980	-0,197	0,247	0,424	0,172	0,251	0,493
Infringes	Const.	-2,987	0,977	0,002	-4,270	1,000	0,000	-2,481	0,707	0,000	-2,967	1,152	0,010	-7,053	1,128	0,000
	Age	0,007	0,007	0,361	0,016	0,007	0,020	0,006	0,005	0,254	0,007	0,008	0,405	0,024	0,008	0,001
	Income	0,000	0,000	0,146	0,000	0,000	0,058	0,000	0,000	0,858	0,000	0,000	0,515	0,000	0,000	0,042
	Altruistic	-0,022	0,084	0,793	-0,022	0,085	0,800	0,138	0,060	0,021	-0,107	0,099	0,280	0,007	0,092	0,939
	Biospheric	0,018	0,080	0,822	0,146	0,081	0,072	-0,099	0,057	0,084	0,257	0,096	0,007	0,261	0,089	0,003
	Egoistic	0,050	0,070	0,475	-0,001	0,070	0,992	0,002	0,050	0,963	0,013	0,081	0,869	0,041	0,073	0,578
	NEP	0,069	0,154	0,656	-0,019	0,151	0,901	0,217	0,109	0,047	-0,010	0,178	0,956	0,061	0,161	0,704
	AC	0,081	0,088	0,360	0,128	0,089	0,152	0,057	0,061	0,354	-0,140	0,100	0,164	0,116	0,095	0,222
	Trust G	0,016	0,057	0,776	-0,065	0,056	0,245	-0,083	0,040	0,037	-0,050	0,067	0,458	-0,063	0,058	0,283
	Trust Int	-0,033	0,054	0,545	-0,003	0,053	0,950	-0,035	0,037	0,353	-0,064	0,063	0,307	0,033	0,055	0,554
	ARI	0,048	0,067	0,468	0,106	0,068	0,117	0,127	0,047	0,007	0,068	0,079	0,387	0,133	0,069	0,054
	ARS	0,020	0,102	0,844	0,163	0,108	0,131	0,074	0,076	0,331	0,292	0,128	0,022	0,315	0,124	0,011
	PN	-0,195	0,096	0,042	-0,218	0,098	0,027	-0,135	0,073	0,064	-0,202	0,114	0,078	-0,299	0,107	0,005
	State1	0,054	0,059	0,359	0,077	0,060	0,198	0,001	0,040	0,984	0,162	0,075	0,031	0,155	0,066	0,018
	State2	0,066	0,053	0,215	0,083	0,053	0,117	-0,006	0,037	0,864	-0,078	0,061	0,204	0,049	0,055	0,368
	Male=1	-0,231	0,203	0,255	-0,154	0,200	0,440	-0,126	0,140	0,369	-0,298	0,238	0,211	-0,194	0,211	0,359
	Education lower secondary	0,176	0,397	0,657	-0,454	0,393	0,247	-0,118	0,261	0,652	-0,733	0,507	0,149	-0,116	0,449	0,797
	Education upper secondary	0,207	0,351	0,556	-0,138	0,316	0,662	0,088	0,227	0,697	-0,118	0,378	0,754	0,530	0,350	0,130
	Education tertiary	0,586	0,348	0,093	-0,020	0,310	0,949	0,341	0,230	0,138	-0,004	0,376	0,991	0,171	0,350	0,625
n		1177			1247			1264			1095			1183		
Nagelkerke		0,090			0,140			0,074			0,152			0,176		

Table 35: MNL regression results for perceived coerciveness in the United Kingdom (imputed data)

		United Kingdom																	
		Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
		B	Std. Errd	Sig.	B	Std. Errd	Sig.	B	Std. Errd	Sig.	B	Std. Errd	Sig.	B	Std. Errd	Sig.	B	Std. Errd	Sig.
Not Infringes	Const.	-3,478	0,983	0,000	-4,120	0,979	0,000	-3,731	1,261	0,003	-2,016	0,984	0,040	-2,506	0,923	0,007	-2,563	0,896	0,004
	Age	-0,007	0,007	0,321	-0,005	0,007	0,432	-0,006	0,009	0,481	-0,002	0,007	0,785	-0,004	0,007	0,593	0,006	0,006	0,330
	Income	0,000	0,000	0,082	0,000	0,000	0,049	0,000	0,000	0,060	0,000	0,000	0,591	0,000	0,000	0,161	0,000	0,000	0,193
	Altruistic	0,127	0,088	0,146	0,239	0,086	0,005	0,279	0,111	0,012	0,141	0,087	0,104	0,189	0,084	0,025	0,347	0,082	0,000
	Biospheric	-0,043	0,087	0,624	-0,119	0,085	0,160	-0,008	0,108	0,945	-0,072	0,087	0,410	0,019	0,084	0,824	-0,192	0,080	0,016
	Egoistic	-0,086	0,075	0,252	-0,213	0,074	0,004	-0,241	0,097	0,013	-0,258	0,077	0,001	-0,257	0,073	0,000	-0,188	0,069	0,007
	NEP	0,551	0,159	0,001	0,564	0,156	0,000	0,617	0,200	0,002	0,636	0,162	0,000	0,502	0,152	0,001	0,565	0,148	0,000
	AC	-0,181	0,097	0,063	-0,178	0,095	0,061	-0,287	0,121	0,018	-0,132	0,098	0,181	-0,262	0,093	0,005	-0,270	0,090	0,003
	Trust G	-0,042	0,056	0,451	-0,066	0,054	0,223	-0,084	0,070	0,228	0,056	0,056	0,320	-0,008	0,052	0,881	0,048	0,051	0,344
	Trust Int	0,005	0,055	0,933	0,065	0,054	0,224	0,092	0,068	0,179	-0,002	0,056	0,968	-0,046	0,052	0,372	-0,068	0,051	0,183
	ARI	0,096	0,067	0,153	0,179	0,067	0,007	0,120	0,084	0,155	0,047	0,068	0,483	0,027	0,064	0,667	0,009	0,062	0,880
	ARS	0,153	0,128	0,232	0,166	0,128	0,192	0,065	0,158	0,680	0,210	0,129	0,103	0,132	0,124	0,289	0,088	0,117	0,451
	PN	-0,038	0,121	0,755	0,057	0,118	0,630	-0,125	0,151	0,407	-0,174	0,118	0,140	0,081	0,116	0,484	0,058	0,109	0,594
	State1	-0,074	0,060	0,219	-0,139	0,059	0,019	-0,072	0,075	0,342	-0,198	0,062	0,001	-0,078	0,058	0,180	-0,162	0,056	0,004
	State2	-0,073	0,055	0,179	-0,063	0,054	0,236	0,020	0,070	0,771	-0,179	0,056	0,001	-0,075	0,052	0,153	-0,115	0,050	0,022
	Male=1	-0,140	0,189	0,458	-0,178	0,184	0,334	-0,474	0,241	0,049	-0,176	0,191	0,358	0,054	0,178	0,762	0,010	0,171	0,952
	Education lower secondary	0,092	0,359	0,798	0,032	0,356	0,928	0,012	0,429	0,977	0,127	0,359	0,724	-0,235	0,329	0,476	0,476	0,328	0,147
	Education upper secondary	0,201	0,369	0,585	0,345	0,365	0,344	-0,312	0,461	0,499	-0,010	0,373	0,979	-0,270	0,340	0,427	0,403	0,337	0,233
	Education tertiary	-0,114	0,361	0,753	-0,047	0,359	0,897	-0,306	0,445	0,491	0,128	0,359	0,722	-0,300	0,328	0,360	0,025	0,330	0,941
Infringes	Const.	-5,863	1,092	0,000	-3,923	0,997	0,000	-5,142	0,830	0,000	-5,645	1,201	0,000	-4,627	1,038	0,000	-5,389	1,124	0,000
	Age	0,004	0,008	0,634	0,015	0,007	0,041	0,018	0,006	0,003	0,011	0,009	0,204	0,020	0,008	0,010	-0,007	0,008	0,375
	Income	0,000	0,000	0,864	0,000	0,000	0,758	0,000	0,000	0,830	0,000	0,000	0,666	0,000	0,000	0,942	0,000	0,000	0,279
	Altruistic	-0,051	0,107	0,637	0,083	0,099	0,407	0,073	0,077	0,344	-0,085	0,117	0,468	-0,041	0,104	0,694	-0,004	0,110	0,968
	Biospheric	0,086	0,107	0,421	0,122	0,099	0,215	0,075	0,076	0,326	0,385	0,119	0,001	0,201	0,105	0,055	0,204	0,110	0,062
	Egoistic	0,212	0,090	0,019	0,070	0,084	0,406	0,217	0,066	0,001	0,052	0,094	0,582	0,130	0,088	0,143	0,010	0,090	0,907
	NEP	-0,168	0,187	0,368	-0,430	0,174	0,013	0,176	0,136	0,195	-0,297	0,202	0,141	-0,378	0,183	0,039	-0,160	0,190	0,401
	AC	0,376	0,119	0,002	0,099	0,105	0,345	0,028	0,084	0,737	0,360	0,126	0,004	0,191	0,114	0,093	0,240	0,120	0,046
	Trust G	0,119	0,062	0,053	0,101	0,056	0,073	-0,056	0,046	0,222	0,135	0,067	0,044	-0,010	0,059	0,870	0,143	0,063	0,023
	Trust Int	-0,047	0,065	0,465	-0,031	0,059	0,597	0,015	0,047	0,748	-0,081	0,070	0,249	0,062	0,062	0,319	-0,020	0,066	0,763
	ARI	0,263	0,085	0,002	0,144	0,077	0,059	0,258	0,060	0,000	0,379	0,096	0,000	0,191	0,080	0,018	0,223	0,085	0,009
	ARS	-0,143	0,139	0,304	-0,086	0,128	0,503	-0,090	0,104	0,387	-0,298	0,150	0,048	-0,109	0,136	0,425	-0,186	0,146	0,204
	PN	-0,041	0,132	0,756	0,103	0,122	0,398	-0,014	0,099	0,885	-0,062	0,144	0,666	0,033	0,131	0,801	0,098	0,139	0,480
	State1	0,222	0,077	0,004	0,152	0,070	0,029	0,103	0,054	0,055	0,169	0,084	0,044	0,165	0,074	0,025	0,222	0,080	0,006
	State2	0,143	0,064	0,026	0,172	0,060	0,004	0,099	0,047	0,036	0,195	0,071	0,006	0,168	0,062	0,007	0,198	0,066	0,003
	Male=1	0,056	0,204	0,785	0,029	0,191	0,878	-0,058	0,156	0,710	0,063	0,226	0,781	-0,148	0,200	0,457	-0,211	0,208	0,311
	Education lower secondary	-0,275	0,356	0,440	-0,641	0,322	0,047	-0,157	0,274	0,566	-0,336	0,366	0,358	-0,248	0,344	0,471	-0,359	0,355	0,312
	Education upper secondary	-0,064	0,366	0,861	-0,303	0,327	0,354	-0,236	0,282	0,403	-0,719	0,396	0,069	-0,226	0,353	0,522	-0,242	0,367	0,509
	Education tertiary	-0,374	0,362	0,301	-0,729	0,327	0,026	-0,413	0,275	0,133	-0,601	0,378	0,112	-0,652	0,355	0,067	-0,436	0,360	0,225
	n	874			894			902			811			869			876		
	Nagelkerke	0,250			0,253			0,182			0,320			0,280			0,324		

Table 36: MNL regression results for perceived coerciveness in Poland (imputed data)

		Poland																	
		Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
		B	Std. Errd	Sig.	B	Std. Errd	Sig.	B	Std. Errd	Sig.	B	Std. Errd	Sig.	B	Std. Errd	Sig.	B	Std. Errd	Sig.
Not Infringes	Const.	-3,418	0,974	0,000	-3,176	0,909	0,000	-2,689	1,090	0,014	-3,728	0,927	0,000	-3,586	0,924	0,000	-2,350	0,818	0,004
	Age	-0,008	0,007	0,261	-0,019	0,007	0,005	-0,007	0,008	0,396	-0,005	0,007	0,464	-0,009	0,007	0,181	-0,016	0,006	0,013
	Income	0,000	0,000	0,169	0,000	0,000	0,186	0,000	0,000	0,519	0,000	0,000	0,457	0,000	0,000	0,852	0,000	0,000	0,919
	Altruistic	0,102	0,100	0,306	0,191	0,091	0,036	-0,061	0,107	0,570	0,095	0,091	0,295	0,055	0,090	0,545	0,284	0,080	0,000
	Biospheric	-0,015	0,095	0,875	0,002	0,084	0,982	0,173	0,108	0,109	-0,009	0,092	0,920	0,104	0,088	0,238	-0,051	0,075	0,501
	Egoistic	-0,051	0,073	0,479	-0,075	0,068	0,268	-0,080	0,083	0,335	-0,053	0,070	0,445	0,004	0,069	0,949	-0,211	0,063	0,001
	NEP	0,488	0,176	0,005	0,698	0,167	0,000	0,379	0,197	0,054	0,530	0,164	0,001	0,650	0,164	0,000	0,574	0,147	0,000
	AC	0,096	0,095	0,313	-0,120	0,087	0,170	-0,005	0,108	0,962	-0,059	0,088	0,505	-0,137	0,087	0,116	-0,037	0,080	0,645
	Trust G	-0,148	0,058	0,010	-0,085	0,052	0,100	-0,092	0,064	0,150	-0,083	0,050	0,098	-0,151	0,054	0,006	-0,066	0,046	0,157
	Trust Int	-0,003	0,054	0,952	-0,011	0,050	0,822	-0,021	0,060	0,732	0,000	0,050	1,000	-0,009	0,050	0,851	-0,075	0,045	0,098
	ARI	0,081	0,074	0,272	0,098	0,068	0,148	0,110	0,084	0,188	0,159	0,069	0,022	0,077	0,069	0,265	-0,006	0,061	0,925
	ARS	-0,110	0,131	0,402	-0,019	0,122	0,874	0,023	0,149	0,876	0,005	0,126	0,968	-0,152	0,124	0,221	0,089	0,110	0,419
	PN	0,235	0,129	0,068	0,305	0,119	0,010	-0,025	0,142	0,862	0,300	0,120	0,012	0,220	0,121	0,068	0,018	0,103	0,860
	State1	-0,051	0,070	0,468	-0,168	0,066	0,010	-0,016	0,080	0,840	-0,019	0,068	0,776	-0,011	0,066	0,866	-0,017	0,059	0,776
	State2	-0,006	0,059	0,916	-0,098	0,055	0,077	-0,014	0,069	0,837	-0,118	0,056	0,035	-0,006	0,057	0,915	-0,008	0,050	0,878
	Male=1	-0,374	0,209	0,074	-0,243	0,189	0,200	-0,345	0,239	0,149	-0,311	0,190	0,102	-0,167	0,198	0,399	0,077	0,172	0,656
	Education lower secondary	-0,945	0,409	0,021	-0,698	0,384	0,069	-0,274	0,464	0,554	-0,607	0,374	0,105	-0,096	0,374	0,797	-0,430	0,357	0,229
	Education upper secondary	-1,186	0,374	0,002	-0,717	0,351	0,041	-0,471	0,430	0,274	-0,990	0,346	0,004	-0,747	0,353	0,035	-0,765	0,332	0,021
	Education tertiary	-0,756	0,366	0,039	-0,770	0,355	0,030	-0,385	0,430	0,370	-0,994	0,346	0,004	-0,468	0,352	0,184	-0,575	0,335	0,086
Infringes	Const.	-3,532	0,814	0,000	-4,246	0,851	0,000	-2,738	0,738	0,000	-3,054	0,982	0,002	-3,784	0,880	0,000	-3,930	0,975	0,000
	Age	0,006	0,006	0,298	0,004	0,006	0,468	0,011	0,005	0,041	-0,014	0,007	0,042	0,006	0,006	0,360	0,009	0,007	0,212
	Income	0,000	0,000	0,657	0,000	0,000	0,305	0,000	0,000	0,956	0,000	0,000	0,843	0,000	0,000	0,859	0,000	0,000	0,327
	Altruistic	-0,007	0,078	0,932	-0,056	0,081	0,488	0,095	0,073	0,195	-0,088	0,092	0,339	-0,118	0,084	0,157	-0,250	0,094	0,008
	Biospheric	-0,023	0,077	0,761	0,163	0,080	0,043	0,032	0,070	0,648	0,235	0,098	0,016	0,200	0,084	0,017	0,347	0,098	0,000
	Egoistic	0,010	0,060	0,866	0,071	0,062	0,251	0,020	0,055	0,713	0,007	0,073	0,923	0,003	0,063	0,963	0,126	0,074	0,089
	NEP	-0,178	0,143	0,215	-0,004	0,152	0,981	0,023	0,130	0,861	-0,163	0,172	0,344	-0,214	0,152	0,159	-0,383	0,173	0,027
	AC	0,138	0,076	0,068	0,013	0,080	0,870	-0,023	0,069	0,741	-0,027	0,092	0,766	0,080	0,084	0,338	0,008	0,094	0,928
	Trust G	-0,051	0,042	0,230	-0,021	0,044	0,636	-0,025	0,039	0,527	0,030	0,050	0,554	-0,015	0,045	0,748	0,087	0,049	0,079
	Trust Int	0,073	0,044	0,099	0,014	0,045	0,756	-0,016	0,040	0,698	-0,020	0,053	0,711	0,023	0,047	0,627	-0,147	0,053	0,006
	ARI	0,138	0,062	0,026	0,182	0,065	0,005	0,093	0,055	0,091	0,156	0,076	0,039	0,134	0,066	0,042	0,025	0,074	0,736
	ARS	0,024	0,107	0,825	0,191	0,112	0,088	0,005	0,098	0,962	0,108	0,129	0,400	0,160	0,117	0,172	0,254	0,135	0,060
	PN	0,182	0,101	0,071	0,104	0,102	0,310	0,068	0,092	0,460	0,099	0,119	0,404	0,188	0,108	0,080	0,183	0,121	0,130
	State1	0,206	0,065	0,002	0,087	0,067	0,192	0,163	0,057	0,004	0,260	0,084	0,002	0,099	0,066	0,133	0,244	0,080	0,002
	State2	0,022	0,049	0,650	-0,038	0,051	0,458	-0,039	0,045	0,384	-0,048	0,061	0,425	-0,086	0,053	0,107	0,076	0,061	0,216
	Male=1	-0,032	0,164	0,847	-0,040	0,168	0,811	-0,065	0,151	0,668	-0,119	0,196	0,545	-0,045	0,178	0,800	0,192	0,195	0,324
	Education lower secondary	-0,121	0,344	0,726	-0,251	0,365	0,492	-0,285	0,320	0,372	-0,274	0,400	0,493	0,323	0,393	0,410	-0,472	0,403	0,242
	Education upper secondary	-0,388	0,318	0,224	-0,266	0,334	0,425	-0,275	0,294	0,350	-0,464	0,364	0,202	0,290	0,361	0,423	-0,619	0,367	0,092
	Education tertiary	-0,453	0,318	0,154	-0,168	0,330	0,611	-0,246	0,294	0,403	-0,439	0,360	0,222	0,129	0,362	0,723	-0,393	0,363	0,279
	n	875			889			904			777			850			887		
	Nagelkerke	0,157			0,197			0,083			0,161			0,169			0,257		

Table 37: Multivariate probit results for perceived effectiveness in the Czech Republic (imputed data)

	Czech Republic (n=1403)																	
	Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z
Const.	-0,293	0,710	0,680	-0,393	0,572	0,492	0,513	0,544	0,346	-0,145	0,460	0,753	-0,954	0,520	0,066	-0,881	0,505	0,081
Age	-0,010	0,006	0,100	0,004	0,004	0,413	-0,006	0,004	0,165	0,000	0,003	0,890	0,005	0,004	0,221	0,001	0,004	0,783
Income	0,000	0,000	0,920	0,000	0,000	0,051	0,000	0,000	0,758	0,000	0,000	0,399	0,000	0,000	0,293	0,000	0,000	0,688
Altruistic	-0,117	0,056	0,038	0,016	0,048	0,737	-0,003	0,045	0,950	0,059	0,038	0,122	-0,031	0,044	0,475	-0,005	0,043	0,913
Biospheric	-0,001	0,057	0,985	-0,032	0,045	0,474	-0,044	0,044	0,316	-0,049	0,036	0,181	-0,015	0,042	0,725	-0,045	0,041	0,275
Egoistic	-0,054	0,052	0,293	-0,046	0,043	0,276	-0,076	0,040	0,054	-0,044	0,033	0,181	0,009	0,038	0,802	0,009	0,037	0,795
NEP	0,130	0,107	0,224	0,076	0,090	0,399	0,162	0,086	0,060	0,153	0,072	0,033	0,043	0,081	0,595	0,156	0,080	0,052
AC	-0,069	0,063	0,277	-0,048	0,051	0,338	-0,158	0,046	0,001	-0,082	0,039	0,036	-0,028	0,045	0,531	-0,073	0,044	0,099
Trust G	-0,064	0,053	0,229	-0,097	0,037	0,009	-0,077	0,036	0,032	-0,036	0,028	0,195	0,009	0,031	0,778	-0,064	0,033	0,052
Trust Int	-0,106	0,047	0,026	-0,014	0,033	0,686	-0,039	0,032	0,230	-0,063	0,026	0,015	-0,043	0,030	0,153	-0,045	0,030	0,131
ARI	0,001	0,049	0,979	0,031	0,039	0,432	-0,014	0,038	0,708	-0,032	0,030	0,293	-0,016	0,035	0,649	0,064	0,035	0,069
ARS	-0,140	0,071	0,048	-0,042	0,057	0,466	-0,123	0,055	0,026	-0,088	0,047	0,063	-0,090	0,052	0,085	-0,156	0,051	0,002
PN	0,058	0,071	0,420	-0,155	0,055	0,005	0,018	0,056	0,750	0,056	0,048	0,245	0,009	0,053	0,859	0,025	0,052	0,633
State1	0,101	0,045	0,026	0,004	0,033	0,907	0,014	0,032	0,669	-0,050	0,025	0,049	0,048	0,031	0,124	0,019	0,029	0,529
State2	-0,009	0,038	0,820	-0,020	0,030	0,513	-0,033	0,029	0,253	-0,030	0,024	0,215	-0,022	0,027	0,418	-0,004	0,027	0,885
Male=0 (ref)																		
Male=1	-0,102	0,157	0,516	-0,230	0,123	0,060	-0,300	0,116	0,009	-0,438	0,095	0,000	-0,154	0,110	0,160	-0,110	0,106	0,296
Education primary (ref)																		
Education lower secondary	-0,139	0,203	0,493	0,108	0,170	0,524	0,077	0,153	0,614	-0,036	0,132	0,786	0,058	0,146	0,690	-0,099	0,150	0,510
Education upper secondary	-0,134	0,204	0,511	-0,029	0,180	0,873	-0,104	0,160	0,515	-0,012	0,134	0,930	-0,192	0,157	0,221	-0,087	0,152	0,567
Education tertiary	-0,296	0,272	0,276	0,047	0,199	0,815	-0,397	0,211	0,060	0,162	0,147	0,272	-0,096	0,177	0,588	0,371	0,158	0,019
Wald	238,0																	
Log likelihood	-1810,0																	

Table 38: Multivariate probit results for perceived effectiveness in the United Kingdom (imputed data)

	United Kingdom (n =1129)																	
	Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z
Const.	0,535	0,661	0,418	0,111	0,631	0,861	-0,761	0,627	0,225	-0,443	0,547	0,418	-0,896	0,581	0,123	0,368	0,560	0,510
Age	-0,001	0,005	0,820	0,013	0,005	0,010	0,013	0,005	0,009	0,016	0,004	0,000	0,011	0,005	0,022	0,000	0,004	0,958
Income	0,000	0,000	0,047	0,000	0,000	0,604	0,000	0,000	0,159	0,000	0,000	0,909	0,000	0,000	0,390	0,000	0,000	0,084
Altruistic	0,039	0,059	0,504	-0,057	0,059	0,333	0,065	0,058	0,263	0,146	0,049	0,003	0,119	0,055	0,030	0,034	0,050	0,487
Biospheric	0,119	0,061	0,052	0,156	0,060	0,009	0,165	0,059	0,005	-0,006	0,049	0,896	0,058	0,054	0,282	0,104	0,052	0,046
Egoistic	-0,210	0,056	0,000	-0,063	0,053	0,239	-0,095	0,051	0,065	-0,123	0,044	0,005	-0,073	0,048	0,124	-0,185	0,046	0,000
NEP	0,157	0,113	0,163	-0,063	0,114	0,579	-0,009	0,109	0,932	0,262	0,094	0,006	0,197	0,099	0,046	0,261	0,096	0,007
AC	-0,167	0,069	0,015	-0,096	0,065	0,138	-0,124	0,061	0,043	-0,115	0,056	0,039	-0,227	0,058	0,000	-0,192	0,058	0,001
Trust G	-0,017	0,043	0,685	-0,093	0,040	0,022	-0,018	0,038	0,624	-0,021	0,032	0,509	-0,024	0,035	0,484	-0,019	0,034	0,569
Trust Int	-0,057	0,040	0,155	-0,036	0,039	0,347	-0,063	0,037	0,086	-0,051	0,032	0,115	-0,035	0,035	0,311	-0,061	0,033	0,066
ARI	0,016	0,050	0,755	0,031	0,048	0,511	0,046	0,045	0,310	-0,034	0,040	0,387	0,035	0,043	0,414	0,034	0,041	0,413
ARS	-0,062	0,081	0,449	-0,053	0,081	0,509	-0,003	0,078	0,971	-0,092	0,069	0,182	-0,055	0,076	0,470	-0,147	0,071	0,039
PN	-0,295	0,073	0,000	-0,172	0,069	0,013	-0,250	0,068	0,000	-0,177	0,063	0,005	-0,219	0,065	0,001	-0,113	0,065	0,085
State1	-0,009	0,042	0,827	-0,031	0,042	0,457	-0,030	0,040	0,456	-0,095	0,034	0,006	-0,017	0,039	0,659	-0,089	0,035	0,012
State2	-0,019	0,038	0,610	-0,073	0,037	0,049	-0,041	0,036	0,257	-0,069	0,032	0,029	-0,017	0,034	0,613	-0,058	0,032	0,072
Male=0 (ref)																		
Male=1	-0,094	0,145	0,516	-0,033	0,137	0,809	-0,014	0,133	0,917	-0,238	0,113	0,036	-0,108	0,124	0,381	-0,068	0,117	0,564
Education primary (ref)																		
Education lower secondary	-0,092	0,180	0,609	0,096	0,170	0,571	-0,319	0,175	0,068	-0,002	0,146	0,990	0,116	0,155	0,455	-0,218	0,157	0,166
Education upper secondary	-0,328	0,295	0,267	-0,405	0,321	0,207	0,045	0,228	0,842	-0,084	0,215	0,696	0,242	0,213	0,257	-0,225	0,222	0,311
Education tertiary	-0,125	0,185	0,500	0,101	0,184	0,583	-0,053	0,173	0,760	0,091	0,150	0,544	-0,044	0,177	0,803	0,113	0,150	0,453
Wald	293,9																	
Log likelihood	-1075,9																	

Table 39: Multivariate probit results for perceived effectiveness in Poland (imputed data)

Poland (n=1037)																		
	Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z
Const.	-0,710	0,985	0,471	-1,421	0,818	0,082	0,332	0,629	0,597	-1,647	0,505	0,001	-0,561	0,583	0,336	-0,445	0,612	0,467
Age	0,011	0,008	0,152	0,005	0,007	0,442	-0,003	0,005	0,521	0,006	0,004	0,150	-0,006	0,005	0,197	-0,004	0,005	0,414
Income	0,000	0,000	0,531	0,000	0,000	0,411	0,000	0,000	0,747	0,000	0,000	0,818	0,000	0,000	0,371	0,000	0,000	0,116
Altruistic	0,125	0,098	0,206	0,098	0,082	0,233	0,052	0,063	0,411	0,084	0,052	0,107	0,144	0,061	0,018	0,089	0,063	0,153
Biospheric	-0,014	0,089	0,873	-0,039	0,076	0,608	0,035	0,060	0,565	0,053	0,050	0,283	-0,031	0,054	0,569	-0,068	0,061	0,268
Egoistic	0,037	0,079	0,640	0,045	0,069	0,510	0,019	0,051	0,707	-0,082	0,039	0,038	0,010	0,047	0,827	-0,095	0,053	0,072
NEP	0,086	0,172	0,617	0,351	0,158	0,026	0,015	0,116	0,898	0,214	0,090	0,018	0,141	0,105	0,179	0,243	0,117	0,039
AC	-0,255	0,082	0,002	-0,107	0,074	0,150	-0,202	0,059	0,001	-0,122	0,047	0,010	-0,133	0,055	0,016	-0,193	0,061	0,002
Trust G	-0,072	0,062	0,245	-0,060	0,054	0,266	-0,106	0,041	0,009	-0,017	0,030	0,579	-0,057	0,038	0,140	0,039	0,043	0,358
Trust Int	0,028	0,060	0,633	-0,037	0,051	0,466	-0,026	0,037	0,480	0,000	0,029	0,997	-0,020	0,035	0,566	-0,083	0,042	0,046
ARI	0,087	0,077	0,258	0,066	0,067	0,320	0,091	0,053	0,087	0,092	0,039	0,019	0,005	0,047	0,914	0,107	0,053	0,046
ARS	-0,426	0,127	0,001	-0,343	0,105	0,001	-0,258	0,081	0,001	-0,176	0,068	0,010	-0,189	0,076	0,013	-0,183	0,079	0,021
PN	0,127	0,119	0,286	-0,015	0,103	0,884	0,110	0,081	0,173	0,100	0,067	0,134	0,111	0,077	0,149	0,041	0,081	0,615
State1	-0,080	0,063	0,206	-0,089	0,054	0,098	-0,135	0,045	0,003	-0,039	0,037	0,294	-0,064	0,043	0,141	-0,030	0,047	0,529
State2	-0,142	0,064	0,026	0,015	0,052	0,777	0,077	0,044	0,078	-0,068	0,031	0,026	-0,060	0,037	0,108	-0,058	0,042	0,164
Male=0 (ref)																		
Male=1	0,300	0,233	0,198	-0,315	0,194	0,105	-0,189	0,145	0,193	-0,169	0,112	0,131	-0,153	0,136	0,260	-0,155	0,152	0,307
Education primary (ref)																		
Education lower secondary	0,339	0,352	0,335	-0,171	0,281	0,542	-0,320	0,204	0,118	-0,249	0,162	0,124	-0,290	0,199	0,146	-0,310	0,212	0,144
Education upper secondary	0,376	0,356	0,290	0,031	0,276	0,910	-0,202	0,201	0,314	-0,065	0,163	0,690	0,002	0,189	0,993	-0,106	0,209	0,611
Education tertiary	0,287	0,383	0,453	0,056	0,295	0,849	-0,120	0,216	0,579	-0,018	0,179	0,921	0,003	0,209	0,990	-0,096	0,226	0,670
Wald	240,0																	
Log likelihood	-972,2																	

Table 40: Multivariate probit results for perceived coerciveness in the Czech Republic (imputed data)

	Czech Republic (<i>n</i> =1403)																	
	Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z
Const.	-1,340	0,470	0,004	-1,927	0,471	0,000	-1,417	0,387	0,000	-1,295	0,527	0,014	-3,227	0,509	0,000	-1,407	0,538	0,009
Age	0,001	0,003	0,691	0,007	0,003	0,030	0,001	0,003	0,716	-0,001	0,004	0,811	0,010	0,004	0,004	0,003	0,004	0,432
Income	0,000	0,000	0,137	0,000	0,000	0,169	0,000	0,000	0,543	0,000	0,000	0,500	0,000	0,000	0,683	0,000	0,000	0,182
Altruistic	-0,022	0,040	0,574	-0,034	0,040	0,389	0,058	0,032	0,073	-0,080	0,043	0,065	-0,029	0,042	0,489	-0,092	0,047	0,048
Biospheric	0,018	0,039	0,651	0,063	0,039	0,101	-0,043	0,031	0,165	0,117	0,043	0,006	0,126	0,041	0,002	0,111	0,047	0,019
Egoistic	0,041	0,035	0,237	-0,010	0,034	0,777	0,006	0,027	0,823	0,026	0,037	0,484	0,048	0,034	0,154	-0,007	0,039	0,857
NEP	-0,007	0,075	0,925	-0,072	0,075	0,335	0,112	0,060	0,063	-0,079	0,083	0,338	-0,057	0,075	0,450	-0,223	0,087	0,011
AC	0,044	0,043	0,315	0,091	0,044	0,036	0,029	0,033	0,389	-0,053	0,046	0,243	0,081	0,044	0,067	0,076	0,051	0,138
Trust G	0,002	0,027	0,930	-0,036	0,027	0,178	-0,039	0,022	0,071	-0,015	0,030	0,619	-0,024	0,027	0,363	-0,015	0,030	0,631
Trust Int	0,001	0,026	0,966	0,029	0,025	0,244	0,006	0,021	0,762	-0,021	0,028	0,456	0,039	0,026	0,129	0,026	0,029	0,361
ARI	-0,002	0,032	0,962	0,045	0,032	0,154	0,056	0,026	0,029	0,009	0,036	0,808	0,040	0,033	0,216	0,001	0,037	0,978
ARS	-0,020	0,050	0,688	0,038	0,050	0,448	0,028	0,041	0,492	0,101	0,058	0,079	0,114	0,055	0,040	0,010	0,060	0,865
PN	-0,092	0,047	0,051	-0,120	0,047	0,011	-0,064	0,040	0,113	-0,103	0,053	0,051	-0,135	0,050	0,007	0,024	0,059	0,681
State1	0,038	0,028	0,181	0,044	0,028	0,116	-0,015	0,022	0,482	0,109	0,033	0,001	0,075	0,029	0,010	0,038	0,033	0,257
State2	0,021	0,025	0,400	0,054	0,025	0,031	-0,001	0,020	0,957	-0,031	0,028	0,258	0,038	0,025	0,139	-0,021	0,029	0,473
Male=0 (ref)																		
Male=1	-0,188	0,100	0,060	-0,094	0,098	0,341	-0,130	0,077	0,092	-0,245	0,111	0,027	-0,201	0,102	0,048	0,023	0,114	0,840
Education primary (ref)																		
Education lower secondary	0,175	0,135	0,196	0,002	0,126	0,986	0,212	0,106	0,046	0,033	0,144	0,819	0,060	0,138	0,666	0,131	0,144	0,365
Education upper secondary	-0,079	0,144	0,585	-0,253	0,136	0,063	0,037	0,109	0,733	-0,113	0,151	0,454	0,152	0,139	0,276	-0,324	0,166	0,051
Education tertiary	0,019	0,161	0,905	-0,297	0,163	0,068	-0,015	0,126	0,904	-0,298	0,189	0,115	-0,128	0,176	0,468	-0,187	0,189	0,322
Wald	185,7																	
Log likelihood	-2479,0																	

Table 41: Multivariate probit results for perceived coerciveness in the United Kingdom (imputed data)

	United Kingdom (<i>n</i> =1129)																	
	Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z
Const.	-3,186	0,533	0,000	-2,112	0,488	0,000	-3,111	0,425	0,000	-2,791	0,539	0,000	-2,529	0,494	0,000	-2,909	0,514	0,000
Age	0,003	0,004	0,453	0,008	0,004	0,024	0,009	0,003	0,003	0,003	0,004	0,424	0,010	0,004	0,009	-0,004	0,004	0,261
Income	0,000	0,000	0,776	0,000	0,000	0,662	0,000	0,000	0,654	0,000	0,000	0,366	0,000	0,000	0,758	0,000	0,000	0,456
Altruistic	-0,072	0,053	0,173	-0,010	0,048	0,840	-0,003	0,040	0,930	-0,095	0,054	0,077	-0,048	0,049	0,334	-0,052	0,051	0,302
Biospheric	0,089	0,050	0,079	0,102	0,046	0,028	0,080	0,039	0,039	0,270	0,054	0,000	0,129	0,048	0,007	0,147	0,048	0,002
Egoistic	0,130	0,045	0,004	0,074	0,041	0,071	0,121	0,033	0,000	0,042	0,043	0,328	0,089	0,041	0,030	0,013	0,042	0,746
NEP	-0,139	0,091	0,129	-0,284	0,085	0,001	0,073	0,070	0,295	-0,228	0,091	0,012	-0,244	0,085	0,004	-0,148	0,087	0,090
AC	0,202	0,056	0,000	0,046	0,050	0,360	0,010	0,043	0,819	0,151	0,055	0,006	0,109	0,051	0,034	0,131	0,054	0,015
Trust G	0,057	0,030	0,057	0,066	0,028	0,018	-0,001	0,024	0,962	0,070	0,030	0,021	0,013	0,027	0,627	0,078	0,029	0,007
Trust Int	0,004	0,030	0,905	-0,012	0,028	0,680	0,006	0,024	0,804	-0,031	0,031	0,310	0,043	0,028	0,121	0,006	0,029	0,826
ARI	0,098	0,041	0,016	0,012	0,037	0,753	0,107	0,031	0,001	0,107	0,041	0,009	0,063	0,037	0,093	0,082	0,039	0,033
ARS	-0,109	0,066	0,099	-0,049	0,061	0,420	-0,033	0,053	0,530	-0,147	0,065	0,023	-0,086	0,061	0,161	-0,108	0,065	0,095
PN	-0,010	0,063	0,878	0,045	0,058	0,435	-0,011	0,050	0,831	-0,037	0,062	0,546	0,006	0,058	0,914	0,037	0,062	0,553
State1	0,103	0,036	0,005	0,098	0,034	0,004	0,053	0,028	0,058	0,110	0,037	0,003	0,083	0,034	0,016	0,130	0,036	0,000
State2	0,073	0,031	0,017	0,083	0,029	0,004	0,050	0,024	0,041	0,091	0,032	0,004	0,072	0,029	0,013	0,111	0,030	0,000
Male=0 (ref)																		
Male=1	0,010	0,104	0,924	0,007	0,096	0,943	-0,002	0,083	0,980	0,039	0,105	0,708	-0,052	0,097	0,596	-0,095	0,101	0,345
Education primary (ref)																		
Education lower secondary	-0,024	0,141	0,864	-0,211	0,128	0,098	-0,077	0,110	0,487	-0,060	0,141	0,672	-0,119	0,132	0,369	-0,050	0,135	0,709
Education upper secondary	0,363	0,186	0,052	0,137	0,172	0,426	0,182	0,153	0,234	-0,090	0,206	0,661	0,299	0,175	0,088	0,071	0,186	0,704
Education tertiary	0,078	0,137	0,567	-0,059	0,125	0,636	0,163	0,108	0,134	0,130	0,136	0,339	0,109	0,127	0,390	-0,037	0,131	0,778
Wald	352,6																	
Log likelihood	-2017,1																	

Table 42: Multivariate probit results for perceived coerciveness in Poland (imputed data)

	Poland (n=1037)																	
	Tech standards			Subsidies energy			Taxes			ETS			Remove harmful			Information		
	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z	Coef	SE	P> z
Const.	-1,560	0,414	0,000	-1,823	0,412	0,000	-1,524	0,390	0,000	-1,200	0,461	0,009	-1,161	0,422	0,006	-1,543	0,458	0,001
Age	0,004	0,003	0,174	0,005	0,003	0,112	0,006	0,003	0,046	-0,007	0,003	0,033	0,002	0,003	0,627	0,006	0,003	0,103
Income	0,000	0,000	0,780	0,000	0,000	0,188	0,000	0,000	0,500	0,000	0,000	0,426	0,000	0,000	0,517	0,000	0,000	0,395
Altruistic	-0,013	0,041	0,756	-0,043	0,042	0,305	0,052	0,039	0,185	-0,055	0,045	0,223	-0,084	0,042	0,044	-0,181	0,046	0,000
Biospheric	-0,005	0,040	0,905	0,061	0,040	0,127	0,000	0,038	0,990	0,123	0,044	0,006	0,093	0,041	0,022	0,156	0,045	0,001
Egoistic	0,014	0,032	0,667	0,053	0,031	0,091	0,017	0,030	0,574	0,006	0,034	0,851	-0,010	0,032	0,753	0,110	0,035	0,001
NEP	-0,201	0,074	0,006	-0,186	0,073	0,011	-0,007	0,069	0,924	-0,240	0,081	0,003	-0,226	0,075	0,003	-0,312	0,081	0,000
AC	0,044	0,040	0,270	0,019	0,040	0,625	-0,040	0,038	0,293	-0,001	0,044	0,973	0,029	0,041	0,480	-0,014	0,043	0,746
Trust G	0,000	0,023	0,994	0,006	0,023	0,804	0,003	0,022	0,893	0,041	0,025	0,093	0,009	0,023	0,708	0,047	0,025	0,057
Trust Int	0,048	0,023	0,038	0,018	0,023	0,418	0,008	0,022	0,710	-0,002	0,025	0,944	0,025	0,023	0,285	-0,032	0,025	0,207
ARI	0,037	0,032	0,242	0,056	0,032	0,076	0,028	0,030	0,351	0,032	0,036	0,375	0,031	0,032	0,328	-0,007	0,035	0,838
ARS	0,007	0,055	0,902	0,103	0,055	0,062	-0,008	0,053	0,881	0,049	0,060	0,415	0,103	0,056	0,065	0,093	0,060	0,119
PN	0,096	0,053	0,070	0,034	0,052	0,517	0,050	0,050	0,323	0,001	0,057	0,982	0,058	0,053	0,275	0,104	0,058	0,072
State1	0,097	0,033	0,003	0,061	0,032	0,059	0,086	0,031	0,005	0,121	0,037	0,001	0,048	0,033	0,146	0,110	0,037	0,003
State2	0,007	0,026	0,788	-0,010	0,026	0,691	-0,026	0,024	0,278	-0,006	0,028	0,838	-0,039	0,026	0,129	0,017	0,029	0,544
Male=0 (ref)																		
Male=1	-0,067	0,088	0,441	-0,063	0,087	0,467	-0,099	0,083	0,230	-0,141	0,096	0,144	-0,145	0,089	0,104	-0,033	0,096	0,731
Education primary (ref)																		
Education lower secondary	-0,135	0,127	0,287	0,008	0,125	0,950	-0,068	0,119	0,568	0,039	0,141	0,784	-0,112	0,131	0,394	-0,067	0,138	0,628
Education upper secondary	-0,090	0,130	0,488	-0,125	0,130	0,338	-0,126	0,124	0,307	0,022	0,146	0,881	0,100	0,133	0,453	-0,089	0,144	0,539
Education tertiary	0,115	0,144	0,424	-0,055	0,145	0,706	-0,028	0,137	0,840	0,076	0,162	0,642	0,043	0,149	0,772	-0,019	0,159	0,905
Wald	209,6																	
Log likelihood	-2746,1																	

8.3. Appendix to Section 3

Table 43: Complete overview of reviewed studies with respect to measures of policy responses

Source	Type	Response wording	Policy	Index?	Nr. of items	Alpha	Question wording	Cost visible?	Response Type	Nr. of response cats (excl. DK)	Don't know option provided?	Scale with middle point?	Response Categories (as reported)	Mean	Std. Dev	% Positive answers	% Middle point	% Negative answers	N	
Pietsch & McAllister, 2010	single item	favour-oppose	specific	N	1		The government has proposed a plan called an emissions trading scheme to reduce global warming. The government would set a limit on the amount of carbon emissions that companies could produce each year. Companies that exceed that limit could avoid penalties by paying money to other companies that produced fewer emissions than allowed. Do you favour or oppose this proposal?	N	Likert scale	5 ?		Y	strongly favour mildly favour neither mildly oppose strongly oppose			29	29	6	14	22
McCrigh 2008	single item	favour-oppose	specific	N	4		Question wording not reported. setting higher auto emissions standards setting high emissions and pollution standards for business spending more government money developing solar/wind power spending government money to develop alternative sources of auto fuels	N	binary	2 ?		N	oppose / favor	0,74 0,81 0,79 0,86	0,44 0,39 0,41 0,35	74 81 79 86				
McCrigh, Dunlap, & Xiao 2013	composite	favour-oppose	general	Y	3		Next, I am going to read some specific proposals. For each one please say whether you generally favor or oppose it: Setting higher auto emissions standards for automobiles Setting higher emissions and pollution standards for business and industry Imposing mandatory controls on carbon dioxide emissions and other greenhouse gases	N	binary	2 ?		N	oppose / favor						1024	
	single item	favour-oppose	specific	N	11		For each of the following, please tell me whether you favor or oppose the federal government doing it require by law, or encourage with tax breaks, the building of cars that use less gasoline requiring or encouraging the building of appliances that use less electricity building new homes and offices that use less energy to be heated and cooled requiring utilities, or encouraging them with tax breaks, to reduce the amount of greenhouse gases they emit	N	Likert scale	not reported	?	?	not reported			Measured in several years, not reported here.				
Krosnick & MacInnis, 2013							tax breaks for utilities that produce more electricity from water, wind, or sunlight the U.S. government should require all utilities to generate at least 20 percent of their electricity from water, wind, or solar power tax break to companies that burn coal to make electricity if they use new methods to put the air pollution they generate into underground storage areas instead of letting that air pollution go up the smokestacks at their factories requiring or encouraging automobile manufacturers to produce cars that run completely on electricity. giving federal tax breaks to companies to build nuclear power plants increasing taxes on electricity to encourage people to use less of it increasing taxes on gasoline to use less of it													
	single item	favour-oppose	specific	N	3		Question wording not reported. a gasoline tax increase of 50 cents per litre to “reduce motor vehicle pollution by reducing driving / to fund “research projects to reduce pollution from motor vehicles, such as developing hybrid electric vehicle technology, hydrogen fuel cell technology, or alternative fuel sources. a gasoline tax increase of 50 cents per litre and a 17% reduction in income taxes / + posed with the additional statement that the “average Canadian household paid about \$12,000 in income taxes last year, and would pay about \$2000 less per year,’ a gasoline tax increase of 50 cents per litre and a reduction in the Canadian goods and services tax, or “GST,” from 6% to 3% / + posed with the additional statement that the “average household paid about \$4000 in GST last year, and would pay about \$2000 less per year.’	Y	Likert scale	4 N		N			2,16 2,4 2,28 2,65 2,28 2,45				400 397 797 797 797 797	
Hsu, Walters, & Purgas, 2008													strongly oppose somewhat oppose somewhat favour strongly favour							
	composite	support - oppose	general	Y	8		A number of policy options have been proposed to deal with the problem of Global Warming and Climate Change. I am going to read a number of policy options to you. For each policy option, please indicate whether you: strongly support, support, oppose, or strongly oppose that policy. 1) Reduce our dependence on foreign oil 2) Use market incentives to encourage industries to reduce emissions 3) Impose a tax on industry to discourage industry practices that contribute to Global Warming and Climate Change 4) Offer government subsidies for types of energy and other consumer goods that are environmentally friendly 5) Ratify the Kyoto Protocol, committing the US to reducing carbon dioxide emissions 6) Develop renewable energy sources, like hydro power, solar power, and windmills that emit no carbon dioxide 7) Require automobile companies to build more fuel-efficient vehicles 8) Increase the price of fossil fuels (like gasoline) to encourage people to save energy, and encourage the development of energy efficient devices	N	Likert scale	4 N		N		1,114	0,61					
Bies et al. 2012													strongly oppose somewhat oppose somewhat favour strongly favour							

Table 43: *continued*

Source	Type	Response wording	Policy	Index?	Nr. of items	Alpha	Question wording	Cost visible?	Response Type	Nr. of response cats (excl. DK)	Don't know option provided?	Scale with middle point?	Response Categories (as reported)	Mean	Std. Dev	% Positive answers	% Middle point	% Negative answers	N
Leiserowitz 2006	composite	support-oppose	general	Y	6	0.84	Do you think the United States should reduce its emissions of the green-house gases (carbon dioxide, methane, etc.) that are said to cause global warming? In 1997, the United States and other developing countries made an agreement called the Kyoto Protocol to collectively reduce their emis- sions of greenhouse gases. The United States agreed to reduce its emissions by 7% by the year 2010. How much do you favor or oppose this agreement? Carbon dioxide is the primary greenhouse gas said to be causing global warming and is produced by electric power plants and motor vehicles (e.g., cars, trucks and sport utility vehicles). Currently, carbon dioxide is not regulated as a pollutant. How much do you support or oppose the regulation of carbon dioxide as a pollutant? The average new motor vehicle gets 29 miles per gallon of gas. Some people say we should increase average fuel efficiency to 33 miles per gallon, to help reduce carbon dioxide emissions. This would increase new motor vehicle prices by about \$1,000. How much do you support or oppose this idea? The United States government provides approximately \$5 billion a year in subsidies to the fossil fuel industry (coal, oil, natural gas). Some people have proposed transferring these subsidies to the renewable energy industry (wind, solar, biomass, etc.) to develop cleaner forms of energy. This would make fossil fuels more expensive and renewable energy less expensive. How much do you support or oppose this proposal? How much do you support or oppose a 60-cent per gallon gasoline tax, over and above existing gas taxes, to encourage people to drive less and thus reduce carbon dioxide emissions? In order to encourage people to use more fuel-efficient vehicles, some people have proposed a 5 percent “gas guzzler” tax on cars, trucks and sport utility vehicles that get less than 25 miles per gallon. This would add approximately \$1,000 to the price of a \$20,000 car. How much do you support or oppose this proposal? To encourage industry to be more fuel efficient, some people have proposed a business energy tax. This tax would raise the average price of most things you buy, including food and clothing, by 3 percent, or approximately \$380 per person per year. How much do you support or oppose this proposal? One controversial proposal to solve global warming is to create an international market in greenhouse gases. In this system, all countries agree to a global cap on emissions. Each country then gets the right to emit a portion of this global amount. If a country emits more than its portion, it must buy more emission rights from other countries or else pay stiff fines. In principle, how much do you support or oppose an international market that allows countries to buy and sell greenhouse gases? The United States currently emits about 20% of the world’s total greenhouse gases. People disagree whether the U.S. should reduce greenhouse gases on its own, or make reductions only if other countries do too. Which of the following statements comes closest to your own point of view? The United States should reduce its emissions...	mixed	Likert scale	4	Y	N	19,58 6,53	3,68 2,56	had heard of	609 595			
				Y	3	0.78		1= definitely yes to 4 = definitely no	3,41	0,73	90								
								3,33	0,84	88									
								3,03	0,9	77									
								3,13	0,9	79									
								3,02	0,84	71									
								1 = strongly oppose to 4 = strongly support	1,72	0,95	17								
								2,45	1,12	54									
								2,01	0,99	31									
											44								
	composite	support-oppose	general	Y	6	0.88	Question wording not reported. regulating carbon dioxide as a pollutant	N	Likert scale	4	N	N	3,66 2,6	0,75 0,7	76				751
Ding et al., 2011							signing an international treaty that requires the United States to cut its carbon dioxide emissions by 90% by 2050	N					strongly oppose, oppose, support, strongly support						
							adding a surcharge to electrical bills to establish a fund to help make buildings more energy efficient and to teach US citizens how to reduce energy use	Y											
							requiring electric utilities to produce at least 20% of their electricity from renewable energy sources	N											
							providing tax rebates for people who purchase energy-efficient vehicles or solar panels	N											
Hagen et al., 2016							increasing taxes on gasoline (by 25 cents per gallon) and returning the revenues to taxpayers by reducing the federal income tax.	Y											
	composite	support - oppose	general	Y	8		Question wording not reported. require higher fuel efficiency for automobiles	N	Likert scale	5									
							require higher energy efficiency standards for buildings, household appliances, material production, and building methods												
							require higher taxes on electricity	Y											
							require electric utilities to produce at least 20% of their electricity from renewable energy sources by the year 2020												
							provide subsidies to industries to invest in alternative energy development												
						require higher road taxes and tolls													
							require installation of solar panels or photovoltaics on buildings												
							require more compact, higher density, mixed use, and transit oriented development												

Table 43: *continued*

Source	Type	Response wording	Policy	Index?	Nr. of items	Alpha	Question wording	Cost visible?	Response Type	Nr. of response cats (excl. DK)	Don't know option provided?	Scale with middle point?	Response Categories (as reported)	Mean	Std. Dev	% Positive answers	% Middle point	% Negative answers	N		
Wallace et al., 2010	single item	support - oppose	specific	N	1		Almost all human activity involves using energy – or ‘power’ or ‘fuel’. In most cases, this involves using a fossil fuel: oil, gas or coal. Sometimes they are used indirectly in the form of electricity. Using fossil fuels adds carbon dioxide – a greenhouse gas – into the atmosphere which, the vast majority of scientists believe, causes climate change (also known as global warming or the greenhouse effect). Some electricity comes from nuclear power stations. However, this produces waste which is radioactive and therefore dangerous to human health and the environment for thousands of years, although it does not produce any carbon dioxide. Only a small amount of our energy currently comes from renewable sources, such as wind or wood, which do not put extra carbon dioxide into the atmosphere. Therefore many believe that energy use needs to be better managed to cut ‘carbon emissions’. What do you think of such proposals? Tick one:		Likert scale	5	N	Y	support them strongly, support them moderately, no feelings either way, moderately opposed to them, strongly opposed to them			11	31	21	20	17	317
Rickard, Yang, & Schultdt 2015	composite	support - oppose	general	Y	12	0.85	Question wording not reported.	NA	Likert scale	10	Y	N	1 = strongly oppose to 10 = strongly support	6,51	1,29				278		
Rhodes, Axsen, & Jaccard, 2017	composite	support - oppose					How much would you support or oppose ...	Y	Likert scale	4											
			specific	Y	3	0.75	supply-focused regulations vehicle efficiency regulations that require vehicles to be 30% more fuel efficient by the year 2020 building efficiency regulations that require new buildings, appliances, and equipment to be more energy efficient									54	33	8	5		
																53	37	7	3		
			group	Y	3	0.67	voluntary policies subsidies (such as tax rebates) to households/businesses that purchase energy efficient appliances/equipment, educational programs for citizens about climate change and actions to reduce it government investments into research into clean energy sources, such as hydro, solar, or wind						strongly oppose, somewhat oppose, somewhat support, strongly support			38	45	12	5		
							analysed individually: a low carbon fuel standard that requires fuels to have lower carbon emissions by 20% by the year 2020 a carbon tax applying to all individuals and businesses a cap for businesses with tradable emission permits (cap-and-trade) a clean electricity standard that requires electric utilities to generate at least 50% of new electricity from zero-								51	39	6	4			
			specific	N	4											45	41	10	4		
Yang et al., 2014 +2015																52	36	9	3		
																17	36	23	24		
																22	48	20	10		
	composite	support - oppose	general	Y	5	0.84	How much do you support or oppose the following policy proposals? Regulate carbon dioxide as a pollutant	N	Likert scale	5	?	Y		3,75	0,72				572		
Severson & Coleman, 2015							Require electric utilities to produce at least 20% of their electricity from wind, solar, or other renewable energy sources, even if it costs the average household an extra \$100 a year						strongly oppose to strongly support	3,61	1,02						
							Require automakers to increase the fuel efficiency of cars, trucks, and sport-utility vehicles to 54.5 miles per gallon, even if it means that a new vehicle will cost up to \$1,000 more to buy							3,66	1,06						
							Fund more research into renewable energy sources, such as solar and wind power							4,09	0,93						
							Provide tax rebates for people who purchase energy-efficient vehicles or solar panels							3,9	1,02						
Smith & Leiserowitz, 2014	composite	support-oppose	general	Y	4	0.67	Question wording not reported.		Likert scale	4	Y (unsure)	N	strongly support, support, oppose, strongly oppose, unsure	4,43	1,15						
	composite	support-oppose	general	Y	9	0.90	Question wording not reported. Fund more research into renewable energy sources, such as solar and wind power Provide tax rebates for people who purchase energy-efficient vehicles or solar panels Regulate carbon dioxide Sign an international treaty to cut emissions Require electric utilities to produce at least 20% of their electricity renewables Cap and trade Establish a special fund to help make buildings more energy efficient Provide financial aid and technical support to developing countries that agree to limit their greenhouse gas emissions Increase taxes on gasoline	N N N N N N N N N Y	Likert scale	4	?	N		2,61	0,7	85			974		
																3,22	0,8				
																3,07	0,84	82			
																2,81	0,97	71			
																2,59	0,98	61			
																2,55	1,01	58			
																2,46	0,89	58			
																2,47	1	55			
																2,37	0,97	49			
Lubell, Zahrn, & Vedlitz, 2007																2,09	0,96	34			
	composite	support-oppose	general	Y	11	0.86	A number of policy options have been proposed to deal with the problem of Global Warming and Climate Change. I am going to read a number of policy options to you. For each policy option, please indicate whether you: strongly support (4), support (3), oppose (2), or strongly oppose that policy (1). Use market incentives to encourage industries to reduce emissions	N	Likert scale	4	?	N				19	67	11	2	1093	
							Impose a tax on industry to discourage industry practices that contribute to global warming and climate change	Y								21	54	19	5		
							Impose a tax on individuals that discourages them from practices that contribute to global warming and climate change	Y					1 = strongly oppose to 4 = strongly support			10	43	39	8		
							Educate the public on the human causes of global warming and climate change	N								42	52	5	2		
							Set higher prices for types of energy and other consumer goods that are not environmentally friendly	Y								25	55	17	3		
							Ratify the Kyoto Protocol, committing the US to reducing carbon dioxide emissions	N								21	61	13	4		
							Legally require more energy efficient appliances, and industrial systems	N								24	62	13	2		
							Develop renewable energy sources, like hydro power, solar power, and windmills that emit no carbon dioxide	N								44	52	3	0		
							Improve agricultural management practices by reducing the level of methane produced in raising cattle and in rice	N								16	65	17	2		
Lubell, Zahrn, & Vedlitz, 2007						Protect coastal settlements and water supplies from rising sea levels with publicly funded dikes and sea walls	N								10	64	23	2			
						Require automobile companies to build more fuel-efficient vehicles	N								37	54	8	1			

Table 43: *continued*

Source	Type	Response wording	Policy	Index?	Nr. of items	Alpha	Question wording	Cost visible?	Response Type	Nr. of response cats (excl. DK)	Don't know option provided?	Scale with middle point?	Response Categories (as reported)	Mean	Std. Dev	% Positive answers	% Middle point	% Negative answers	N
Zahrn, Brody, Grover, & Vedlitz, 2006	composite	support-oppose	general	Y	11	0.86	<i>Question wording not reported.</i>	N	Likert scale	4			strongly oppose, somewhat oppose, somewhat support, or strongly support	0.86	0.43				511
							Market incentives to reduce industry emissions	N											
							Tax on industries that contribute to climate change	Y											
							Tax on individuals that contribute to climate change	Y											
							Educate the public on human causes of climate change	N											
							Ratify the Kyoto Protocol	N											
							Increase energy efficiency in industry	N											
							Develop renewable energy sources	N											
							Reduce methane in agriculture	N											
							Protect coastal settlements and water supplies	N											
							Require fuel-efficient vehicles	N											
							Increase the price of fossil fuels	Y											
Stoutenborough, Bromley-Trujillo, & Vedlitz, 2015	single item composite measures comparison	support - oppose	specific general	N Y	5		A number of policy alternatives have been proposed to deal with the problem of global warming and the resulting climate change. For each one listed below, please indicate whether you strongly support, support, oppose, or strongly oppose that policy.		Likert scale	4 ?	N		strongly support, support, oppose, or strongly oppose	Year: 2004					
							"Use market incentives to encourage industries to reduce emissions"	N											
							"Impose a tax on industry to discourage industry practices that contribute to global warming"	N											
							"Develop renewable energy sources, like hydro power, solar power, and windmills that emit no carbon dioxide"	N											
							Increase the price of fossil fuels (like gasoline) to encourage people to save energy and encourage the development of energy efficient devices	Y											
							Require automobile companies to build more fuel-efficient vehicles.	N											
							"Use market incentives to encourage industries to reduce emissions"	N											
							"Impose a tax on industry to discourage industry practices that contribute to global warming"	N											
							"Develop renewable energy sources, like hydro power, solar power, and windmills that emit no carbon dioxide"	N											
							Increase the price of fossil fuels (like gasoline) to encourage people to save energy and encourage the development of energy efficient devices	Y											
Rhodes, Axsen, & Jaccard, 2014	single item	support-oppose	specific (existing)	N	2		<i>Question wording not reported.</i>	N	Likert scale	4	N	N	strongly oppose to strongly support			37	53	8	2
							If there were a referendum on maintaining a cleaner fuel regulation (or low carbon fuel standard) in British Columbia, how much would you support or oppose this policy?												
							How much would you support or oppose regulations that require fuels to have lower carbon emissions by 20% by the year 2020?												
							Please see below a list of climate policies that are currently in place in British Columbia. If there were a referendum on maintaining these policies in BC, how much would you support or oppose these policies?	N											
							Energy efficiency regulations for lighting, heating, and cooling systems in buildings												
							Carbon tax												
							Cleaner fuel regulation (or low carbon fuel standard)												
							Clean electricity regulation (or renewable portfolio standard)												
							Carbon neutral government												
Carrico et al., 2015	single item	support-oppose	general	N	1		In general, do you oppose or support the US taking action to decrease greenhouse gas emissions to reduce global warming?	N	Likert scale	7	N	Y	1 = strongly oppose, 4 = neutral, 7 = strongly support	5,52	1,59				354
							How much do you oppose or support the department of agriculture offering financial assistance to farmers who wish to purchase this new irrigation technology that you just read about?	N											
Bolsen, Leeper, & Shapiro, 2014	single item	support - oppose	specific	N			Experiment 1: To what extent do you oppose or support setting caps on emissions of greenhouse gases and forcing companies that exceed the cap to pay other companies or the government, even if this increases costs to consumers?	N	Likert scale	7	N	numeric	1 = strongly oppose to 7 = strongly support						
							Experiment 2: To what extent do you oppose or support setting caps on companies' emissions of greenhouse gases?												
Kaplowitz & McCright, 2015	single item	support-oppose	specific	N	different experiments	exceeding 0.80	support for \$1 per gallon gasoline tax increase:	Y	Likert scale	11	?	Y	1 = totally oppose to 11 = totally support continuous unbounded scale from 0						
							maximum gasoline tax increase supported (in cents per gallon)	Y											
							support for each of five proposed per gallon gasoline tax increases (\$0.20, \$0.40, \$0.60, \$0.80, and \$1.00)	Y											
Lam et al., 2015	composite	support WTSacr	specific	Y	10x2	from 0.82 to 0.94	Are you willing to make adjustments to or sacrifices for this policy?	N	Likert scale	5	N	Y	definitely would not support to would definitely support			% of			
							Would you support this policy?												
							Prohibit the leak of air-conditioned air in public places												
							Restrict the minimum room temperature in public places												
							Gas guzzler tax												
							Subsidies for using renewable energy												
							Subsidies for public transportation												
							Raise electricity price												
							<i>Reinforce building restrictions in land subsidence areas</i>												
							<i>Announce areas with high flood or mudslide risks</i>												
							<i>Subsidies for installing flood doors</i>												
							<i>Build underground retention basin beneath roads</i>												

Table 43: *continued*

Source	Type	Response wording	Policy	Index?	Nr. of items	Alpha	Question wording	Cost visible?	Response Type	Nr. of response cats (excl. DK)	Don't know option provided?	Scale with middle point?	Response Categories (as reported)	Mean	Std. Dev	% Positive answers	% Middle point	% Negative answers	N
Hammar & Jagers, 2006	single item	evaluation (good-bad)	specific	N	1		One important reason for the climate change that has been observed during the last couple of years is considered to be carbon dioxide (CO2) emissions from motor transport among other sources. What is your opinion of the following proposal to limit carbon dioxide emissions in Sweden?	N	Likert scale	5	N	Y	1 = proposal is very good or good, 0 = proposal is neither good nor bad, bad or very bad	0,21	0,41	21 (for =1)			1270
Harring & Jagers, 2013	single item	evaluation (good-bad)	specific	N	1								a very bad suggestion, a rather bad suggestion a neither good nor bad suggestion a rather good suggestion a very good suggestion"						
Hammar & Jagers, 2007	single item	evaluation (good-bad)	specific	N	1		an increased CO2 tax on gasoline	Y	Likert scale	5	N	Y		2,71					
	single item	referendum	specific	N	1		whether the respondent has a positive attitude ('vote in favour') towards a CO2 tax increase or a negative attitude ('vote against')	Y	binary	2	no opinion	N	1 = voting in favour 0 = voting against	0,23	0,42	23			932
	composite	referendum	specific	N	1		If there was a referendum today on what should happen to the fuel taxes, i.e. the taxes on gasoline and diesel, which alternative would you vote for?	Y	ordinal options	5	N	SQ				N select ed	% select ed	Total N	
Kallbekken & Saelen, 2011												Remove the taxes (i.e. reduce the tax by around NOK 5 per litre)				293 358	24,9 30,4	1177	
												Reduce the taxes by NOK 1 per litre				375	31,9		
												No change to the tax rate				97	8,2		
												Increase the taxes by NOK 1 per litre							
												Double the fuel taxes (i.e. increase the taxes by around NOK 5 per litre)				54	4,6		
	composite	referendum	general	Y	7	0.80	Here are some other steps we might take to decrease the amount of CO2 released to the atmosphere. For each one, indicate how you would vote in a national referendum on these steps.	Y	Likert scale	4	N	N							1187-1190
							Government support for a new international organization that would enforce international treaties to reduce CO2 emissions and help poor nations reduce greenhouse gases. This would cost taxpayers \$200 million per year.									8	30	36	26
							A government program to preserve rain forests throughout the world (forests absorb CO2). This would cost taxpayers \$200 million per year									31	38	19	12
Bord, O'Connor, & Fisher, 2000							A requirement that automobile fuel efficiency be increased from the current average of 28 mpg to 33 mpg. To maintain comfort and performance, new car prices would go up by an average of \$2,000						definitely no, probably no, probably yes, definitely yes			20	42	25	13
							A law requiring all public buildings (offices, schools, stores, libraries, etc.) to keep thermostats set at 62 degrees or below in the winter and 80 degrees or above in the summer. This would reduce the use of fuels that produce carbon dioxide									20	33	31	16
							A \$1.00-a-gallon tax on gasoline, over and above existing gas taxes, to reduce driving, thus reducing CO2 emissions									6	12	31	51
							A 10 percent "gas guzzler" tax on cars and vans that get less than 25 miles to the gallon (an added \$2,000 to the price of a \$20,000 car). This would encourage the use of fuel efficient car									23	33	23	21
							An energy use tax on businesses to encourage greater fuel efficiency. This tax would raise the average price of most things you buy, including food and clothing, by 6 percent (\$775 per person per year)									8	30	36	26
	composite	referendum		Y	11		In the following you will find the same list of actions that might be taken to reduce or stop climate change. Would you vote for each of these actions in a national referendum?	N	Likert scale	5	Y	Y		counted	Yes	DK	No		
Bostrom et al., 2012			general in policy classes			3 indexes according to PCA	Requiring cars and trucks to have higher fuel efficiency						1 = definitely no,			76	11	13	
							Increasing taxes on all fossil fuels (e.g., gasoline, oil, coal, kerosene)						2 = probably no,			44	12	44	
							Creating an international market to trade permissions to emit carbon dioxide						3 = don't know,			56	22	22	
							Funding research to make renewable energy technologies cheaper and more effective						4 = probably yes,			93	4	3	
							Changing lifestyles to reduce consumption						5 = definitely yes			57	22	21	
							Planting trees									88	7	5	
							Reducing air pollution from toxic chemicals									80	13	7	
							Limiting population growth									36	21	43	
							Putting more dust in the atmosphere									7	42	51	
							Fertilizing the oceans to make algae grow									26	40	34	
							Largely replacing fossil fuels with nuclear energy									36	32	32	

Table 43: *continued*

Source	Type	Response wording	Policy	Index?	Nr. of items	Alpha	Question wording	Cost visible?	Response Type	Nr. of response cats (excl. DK)	Don't know option provided?	Scale with middle point?	Response Categories (as reported)	Mean	Std. Dev	% Positive answers	% Middle point	% Negative answers	N
O'Conner, Bord, Yarnal, & Wiefek, 2002	composite	referendum	general	Y	4	0.78	<i>Question wording not reported.</i>	Y	Likert scale	4	?	N							612
							An energy tax to fund a new government program to replace power plants that burn coal. The program would replace our two coal plants (in Clearfield and Union Counties) with new plants that would use cleaner sources of energy. But these new plants might not be located in our region. This program would cost each household about \$20 per month.									7	33	33	27
							Tough new regulations would discourage the use of coal. Approximately 900 coal miners work in our five county region, and many more people derive their income from supporting coal mining operations. About half of these jobs would be lost if the new regulations were adopted. These regulations would raise the price of electricity, adding \$20 per month to the typical electric bill.						definitely no, probably no, probably yes, definitely yes			5	27	41	28
							A 10 percent "gas guzzler" tax on vehicles that get less than 25 miles to the gallon (an added \$2,000 to the price of a \$20,000 vehicle). Our mountainous rural region has a high proportion of low-mileage vehicles such as pickup trucks, sport utility vehicles, and minivans.									19	31	21	28
							A national tax on businesses that use coal and oil in their manufacturing. This encourages fuel substitution (natural gas or solar or wind replacing coal) by manufacturing plants that now use coal. Some local firms (e.g., lime production) cannot move; others may choose to move out of the area or out of the country. This tax would raise the cost of most things you buy by 2 percent (about \$20 per household per month)									13	32	32	23
Rosentrater et al., 2012	composite	referendum		Y	5	0.68	<i>"Would you vote for each of these actions in a national referendum?"</i>	N	Likert scale	5	?	Y							
							No-Regrets Approaches												
							Reducing air pollution from toxic chemicals												
							Funding research to make renewable energy technologies cheaper and more effective												
							Planting trees												
Evans, Milfont, & Lawrence, 2014			general in policy classes		3	0.55	Requiring cars and trucks to have higher fuel efficiency						1 = definitely no, 2 = probably no, 3 = don't know, 4 = probably yes, 5 = definitely yes						
							Creating an international market to trade permissions to emit carbon dioxide												
							Behavioral Approaches												
							Changing lifestyles to reduce consumption												
							Limiting population growth												
Hart & Nisbet, 2012					3	0.48	Increasing taxes on all fossil fuels (e.g., gasoline, oil, coal, kerosene)	Y											
							Engineering Approaches												
							Putting more dust in the atmosphere												
							Largely replacing fossil fuels with nuclear energy												
							Fertilizing the oceans to make algae grow												
Joireman & Liu, 2014	composite	agreement	general	Y	2	0.62	<i>Question wording not reported.</i>		Likert scale	5			1 = strongly disagree to 5 = strongly agree						
							Humanity will need to take serious action to reduce the amount of greenhouse gases we emit.	N					1 = not at all to 5 = very willing						
							Support government initiatives to reduce emissions, even if they cause some things to cost more.	Y											
	composite	agreement	general	Y	3	0.71	<i>Question wording not reported.</i>	N	Likert scale	7	N	Y		16,4	4,3				
							We should immediately increase government regulation on industries and businesses that produce a great deal of greenhouse emissions						1 = strongly disagree to 7 = strongly agree						
Kim & Shin, 2017							We should immediately increase taxes on industries and businesses that produce a great deal of greenhouse emissions												
							Concern about global climate change is unwarranted and no action is needed												
	composite	agreement	general	Y	2	0.94	I would be willing to pay higher taxes to reduce global warming	Y	Likert scale	7	N	Y	1 = strongly disagree to 7 = strongly agree						
							I would be willing to pay higher prices for products and services to reduce global warming												
							I would like to see more government spending to address global climate change, regardless of increased taxes.												
McCright et al., 2016					2	0.80	I am willing to pay much higher taxes for governmental actions to prevent global climate change.	Y	Likert scale	7			1 = strongly disagree to 7 = strongly agree			4,1	1,54		
							<i>Question wording not reported.</i>	N	Likert scale	7			1 = strongly disagree; 2 = moderately disagree; 3 = slightly disagree; 4 = I'm not sure; 5 = slightly agree; 6 = moderately agree; 7 = strongly agree						
							It's prudent to wait for results of more research before we reduce our nation's greenhouse gas emissions												
							We should be aggressive in our attempts to reduce our nation's greenhouse gas emissions												
							Overall, trying to reduce our nation's greenhouse gas emissions will be bad for our nation												
Poortinga, Steg, & Vlek, 2002 +2004							President and Congress should make reducing our nation's greenhouse gas emissions a top priority in next 2												
							Trying to reduce our nation's greenhouse gas emissions will help us also deal with other important problems												
							We have too many problems to deal with to try to reduce our nation's greenhouse gas emissions												
	composite	agreement	general in policy	Y	2		<i>Question wording not reported.</i>		Likert scale	5	N	N	1 = totally disagree to 5 = totally agree						
							The free market is the best way to solve environmental problems.												

Table 43: *continued*

Source	Type	Response wording	Policy	Index?	Nr. of items	Alpha	Question wording	Cost visible?	Response Type	Nr. of response cats (excl. DK)	Don't know option provided?	Scale with middle point?	Response Categories (as reported)	Mean	Std. Dev	% Positive answers	% Middle point	% Negative answers	N		
Unsworth, & Fielding, 2014	single item	relative amount	general	N	2		How do you feel about what the government is doing to address climate change?	N	Likert scale	5 ?	Y		1 = not doing enough - needs to do a lot more to 5 = doing too much – needs to do a lot less								
		agreement	specific			To what extent do you agree with the policy of putting a price on carbon?		1 = totally disagree to 5 = totally agree													
Hart, 2011	composite	agreement	general	Y	2	0.704 (correlation)	How much do you agree with each of the following statements about how to address global climate change? We should immediately increase government regulation on industries and businesses that produce a great deal of greenhouse emissions We should immediately increase taxes on industries and businesses that produce a great deal of greenhouse emissions.	N	Likert scale	7 ?	Y		1 = strongly disagree to 7 = strongly agree	5,46	1,71						
Lockwood, 2011	single item	agreement	specific	N	1		<i>split sample framing (frames not reported here)</i> To help reduce our reliance on foreign oil and gas, we should be getting 15% of our energy from renewable sources like wind power and solar energy by 2020. the Government should require people to make their homes more energy efficient. That means giving people financial help to do things like insulate their homes or replace an old boiler and penalties for those who fail to improve their homes. the UK should provide financial assistance to poor countries to help them adapt to the impacts of climate change and to invest in clean energy	N	Likert scale	6 or 7	?	?		disagree very strongly, disagree strongly, ..., agree strongly, agree very strongly				Percentages reported in figures.			
	single item	likelihood of support	specific	N	8		<i>Question wording not reported.</i>		Likert scale	4 ?		N						Means reported for different treatments. Not reported			
Shwom, Dan, & Dietz, 2008							Shifting federal government subsidies away from the fossil fuel industry (coal, oil, natural gas) to the renewable energy industry (wind, solar, biomass, etc.) to encourage cleaner forms of energy. This would make fossil fuels more expensive and renewable energy less expensive. Scientists cannot estimate the exact amount by which energy prices would change. The policy also might cause job losses in some industries and gains in others An energy tax to fund a new government program to replace power plants that burn coal. The program would replace coal plants with new plants that would use cleaner sources of energy. The program would cost about \$20 per household per month	N													
						Y															
							Tough new regulations to discourage the use of coal. This would lead to a loss of jobs in the coal industry but may increase jobs in other energy industries. These regulations would raise the price of electricity, adding about \$20 per month to the typical electrical bill	Y								definitely yes, probably yes, probably no, definitely no					
						Y	A federal tax subsidy to households and businesses that use solar and wind energy. Paying for the subsidy to those who use solar and wind energy would increase the average family's income tax bill by about \$100 per year A national tax on businesses that use coal and oil as fuels in their manufacturing. This encourages energy efficiency and the use of fuels that don't cause climate change. This tax would raise the cost of most things you buy by 2 percent.	Y													
						Y	A 60-cent per-gallon gasoline tax, over and above existing gas taxes, to encourage people to drive less	Y													
						Y	A 10% "gas guzzler" tax on vehicles that get less than 25 miles to the gallon. This would add about \$2,000 to the price of a \$20,000 vehicle	Y													
Lu & Schuldt, 2015	composite	likelihood of support	general in	Y	3	0.72	A requirement that automobile fuel efficiency be increased from the current average of 28 mpg to 33 mpg. To maintain comfort and performance, new car prices would go up by an average of \$2,000 per car	Y													
								<i>Question wording not reported.</i>		Likert scale	7 ?	Y									
								<i>index</i> Create a carbon tax that directly taxes companies that emit greenhouse gases with a fixed fee per ton of pollutants released into the atmosphere	Y										4,95	1,58	
								Eliminate all federal subsidies for the fossil fuel industry (oil, and natural gas), which currently total an estimated \$10.4 billion a year	Y										5,07	1,89	
								Set strict carbon dioxide emission limits on existing coal-fired power plants	N										4,56	1,92	
								<i>index</i> Require electric utilities to produce at least 20 % of their electricity from wind, solar, or other renewable energy sources, even if it cost the average household an extra \$100 a year A \$5-a-month increase in property taxes, to provide funding to help homeowners make energy-efficiency improvements to their homes (such as replacing old, inefficient furnaces, water heaters, air conditioners, and insulation)	Y										5,22	1,78	
							A 10-cent fee added to each gallon of gasoline you buy, to fund local programs to improve public transportation	Y													

Table 43: *continued*

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Dietz, Dan, & Shwom, 2007	composite	probability to support	general	Y	8	0.89	<i>the probability they would support a referendum on different policy options to reduce the burning of fossil fuels</i>		Likert scale	4	N	N							
							Shifting federal government subsidies away from the fossil fuel industry (coal, oil, natural gas) to the renewable energy industry (wind, solar, biomass, etc.) to encourage cleaner forms of energy. This would make fossil fuels more expensive and renewable energy less expensive. Scientists cannot estimate the exact amount by which energy prices would change. The policy also might cause job losses in some industries and gains in others.	N											
							An energy tax to fund a new government program to replace power plants that burn coal. The program would replace coal plants with new plants that would use cleaner sources of energy. The program would cost about \$20 per household per month.	US240											
							Tough new regulations to discourage the use of coal. This would lead to a loss of jobs in the coal industry but may increase jobs in other energy industries. These regulations would raise the price of electricity, adding about \$20 per month to the typical electrical bill.	US240											
							A federal tax subsidy to households and businesses that use solar and wind energy. Paying for the subsidy to those who use solar and wind energy would increase the average family's income tax bill by about \$100 per year. A national tax on businesses that use coal and oil as fuels in their manufacturing. This encourages energy efficiency and the use of fuels that don't cause climate change. This tax would raise the cost of most things you buy by 2 percent.	US100											
								N											
							A 60-cent per-gallon gasoline tax, over and above existing gas taxes, to encourage people to drive less.	N											
							A 10 percent "gas guzzler" tax on vehicles that get less than 25 miles to the gallon. This would add about \$2,000 to the price of a \$20,000 vehicle.	US400											
							A requirement that automobile fuel efficiency be increased from the current average of 28 mpg to 33 mpg. To maintain comfort and performance, new car prices would go up by an average of \$2000 per car.	US400											
							<i>Question wording not reported.</i>	Y											
Shwom et al., 2010	composite	probability to support	general	Y	8		Shifting federal government subsidies away from the fossil fuel industry (coal, oil, natural gas) to the renewable energy industry (wind, solar, biomass, etc.) to encourage cleaner forms of energy. This would make fossil fuels more expensive and renewable energy less expensive. Scientists cannot estimate the exact amount by which energy prices would change. The policy also might cause job losses in some industries and gains in others.		Likert scale	4	N	N							
							An energy tax to fund a new government program to replace power plants that burn coal. The program would replace coal plants with new plants that would use cleaner sources of energy. The program would cost about \$20 per household per month.	US240											
							Tough new regulations to discourage the use of coal. This would lead to a loss of jobs in the coal industry but may increase jobs in other energy industries. These regulations would raise the price of electricity, adding about \$20 per month to the typical electrical bill.	US240											
							A federal tax subsidy to households and businesses that use solar and wind energy. Paying for the subsidy to those who use solar and wind energy would increase the average family's income tax bill by about \$100 per year. A national tax on businesses that use coal and oil as fuels in their manufacturing. This encourages energy efficiency and the use of fuels that don't cause climate change. This tax would raise the cost of most things you buy by 2%.	US100											
								N											
							A 60-cent per-gallon gasoline tax, over and above existing gas taxes, to encourage people to drive less.												
							A 10% "gas guzzler" tax on vehicles that get less than 25 miles to the gallon. This would add about \$2000 to the price of a \$20,000 vehicle.	US400											
							A requirement that automobile fuel efficiency be increased from the current average of 28 mpg to 33 mpg. To maintain comfort and performance, new car prices would go up by an average of \$2000 per car.	US400											
							<i>Question wording not reported.</i>												
							Feedback information about personal household energy use and energy -saving options via telephone, internet and teletext												
Gatersleben, 2001	single item	acceptability	specific	N	10		Information campaign informing people about future energy shortages and ways to reduce household energy use		Likert scale	5	N	Y							
							Increasing gas and electricity prices that exceed a fixed maximum												
							Increasing prices of products with high indirect energy use												
							Rationing direct energy: giving people marketable coupons for their energy consumption												
							Increasing gas and electricity prices												
							Subsidizing energy -saving equipment												
							Increasing gas and electricity prices, combined with a lowering of income tax												
							Giving households the opportunity to buy (more expensive) electric power from green energy sources												
							Increasing car fuel prices and decreasing public transportation prices												

Table 43: *continued*

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Steg, Dreijerink, & Abrahamse 2005 + Steg, de Groot, Dreijerink, & Abrahamse, 2011	composite	acceptability	general	Y	16	0.90	Question wording not reported. increase prices of appliances that are not energy efficient by 10%. revenues are used to stimulate the turntner development of energy-efficient appliances.	Y	Likert scale	5					3,5	0,7				
							Increase prices of appliances that are not energy efficient by 10%. Revenues are used to reduce national debts.				N	Y								
							Increase prices of appliances that have not been produced in an energy-efficient way by 10%. Revenues are used to develop techniques that reduce energy use for the production of appliances. Increase prices of appliances that have not been produced in an energy-efficient way by 10%. Revenues are used to reduce national debts. Increase prices of regular electricity by 10%. Revenues are used to generate more green electricity, e.g. by building windmills Increase prices of regular electricity by 10%. Revenues are used to reduce national debts. Increase prices of imported and greenhouse vegetables and fruit by 10%. Revenues are used to stimulate farmers and market gardeners to grow seasonal vegetables. Increase prices of imported and greenhouse vegetables and fruit by 10%. Revenues are used to reduce national debts. Subsidize energy-efficient appliances so as to make them 10% cheaper. Subsidies are funded from energy taxes charged on appliances that are not energy efficient. Subsidize energy-efficient appliances so as to make them 10% cheaper. Subsidies are paid from general public funds.													
							Subsidize appliances that are produced in an energy-efficient way so as to make them 10% cheaper. Subsidies are funded from energy taxes charged on appliances that are not energy efficient. Subsidize appliances that are produced in an energy-efficient way so as to make them 10% cheaper. Subsidies are paid from general public funds.													
							Decrease prices of green electricity by 10%. Subsidies are paid from an ecotax charged on regular energy. Decrease prices of green electricity by 10%. Subsidies are paid from general public funds.													
							Reduce prices of local seasonal vegetables and fruit (not raised in greenhouses) by 10%. The subsidies are paid from extra taxes on imported and hothouse vegetables and fruit. Reduce prices of local seasonal vegetables and fruit (not raised in greenhouses) by 10%. The subsidies are paid from general public funds.													
Tobler, Visschers, & Siegriest, 2012	composite	acceptability	general in policy classes	Y	9		Question wording not reported.		Likert scale	6	?	N			5,32	1,03				
					(5)	0.83	Subsidies for building and renovating according to the MINERGIE standard(with low energy demand)	N												
					(4)	0.85	Subsidies for electricity generation from renewable energy (such as solar or wind energy)	N							5,23	1,16				
							Subsidies for research projects in the field of climate-friendly technology	N					not acceptable at all to very acceptable		5,19	1,1				
							Extension of public transportation	N							5,07	1,18				
							Subsidies for alternative heating systems (such as wood firing or heat pumps)	N							5,01	1,23				
							Binding CO2 emission limits for new cars	N							5,19	1,25				
							Bonus malus system for car taxes	N							4,68	1,6				
							Increase of CO2 tax on heating oil (from now 9 Rp/Lt to 18 Rp/Lt)	Y							3,79	1,74				
							CO2 tax on gasoline and diesel (15 Rp/Lt)	Y							3,78	1,79				
Carattini & Baranzini, 2014	single item	acceptability	specific	N	3		Despite these drawbacks (from questions 13 and 14), would you accept a CT/CC?	Y	not reported		Y					49			338	
							Would you accept a CT\CC if revenues would be used as chosen in question 17 (and 16)?									64			337	
							If you would be asked to vote on the CT\CC, what energy price increase would you be willing to accept?		ordinal	7	N	SQ	0% / 0%-5% / 5%-10% / 10%-15% / 15%-20% / 20%-25% / 25%-30%					330		
De Groot & Schuitema, 2012	single item	acceptability	specific	N	4		In order to reduce car use due to CO2 emissions, the government is planning to increase tax for those who use cars; currently tax ranges between £90 and £400 per year, but it has been proposed that there will be an increase of 14% (range £102 and £465) on top of what it costs already.	Y	Likert scale	7	N	Y		Means reported for different treatments. Not reported here.					123	
							In order to reduce car use due to CO2 emissions the government is planning to promote public transport with token vouchers. This means that vouchers will be rationed to each household; for example vouchers to get someone to work and back for strongly reduced costs and children having free bus vouchers to school.													
							In order to reduce littering in public areas, the government is planning to increase the current fine for littering. At the moment for example if you throw a cigarette butt away you could face a £50 fine. This will increase by 15% (£65) and also be applied to other forms of littering such as throwing away rubbish and wrappers. Community support officers will be given this extra job to look out for people littering and be given the authority to stop and immediately fine someone.						1 = very unacceptable to 7 = very acceptable							
							In order to reduce littering in public areas, the government is planning to improve the amount of bins in public areas (around 250% more) where there is a severe amount of littering, such as, shopping centres, parks, streets around houses and big towns. These bins will also include a place to discard cigarette butts. A pilot survey indicated that around 14% of a representative sample of the UK population found that this was an acceptable measure to reduce littering in their area. ...													

Table 43: *continued*

Source	Type	Response wording	Policy	Index?	Nr. of items	Alpha	Question wording	Cost visible?	Response Type	Nr. of response cats (excl. DK)	Don't know option provided?	Scale with middle point?	Response Categories (as reported)	Mean	Std. Dev.	% Positive answers	% Middle point	% Negative answers	N	
Attari et al., 2009	single item	support	specific	N	2		Different framings (not reported). Examples: Voluntary action in env. frame: In order to reduce automobile emissions, I would be willing to pledge that the next car I purchase will not be a high emission vehicle such as a SUV or truck Soft regulation: In order to reduce automobile emissions, I would support the government providing tax breaks to individuals who purchase low emission vehicles like compact cars. Hard regulation: In order to reduce automobile emissions, I would support the government restricting the purchase of SUVs and trucks, so that only individuals with approved certification and need can purchase and operate the vehicles.	N	binary		2 N	N		yes/no						209
Dragojlovic & Einsiedel, 2015	single item	approve-disapprove	specific	Y	4		On balance, would you approve or disapprove of government policies that encourage the production of biofuels from the following types of plant matter? 1) corn 2) agricultural waste like corn husks 3) leftover sawdust and wood shavings from lumber mills 4) wood harvested from commercial forests specifically for fuel production 2 policies: federal subsidies to biofuels producers provincial fuel mandates	NA	Likert scale		7 N	Y								1299
Campbell & Kay, 2014	single item	good-bad idea	general	N	1		The proposed solutions to climate change are . . . solutions described in a text preceding the question	N	Likert scale		7			- 3 = very bad ideas to 3 = very good ideas						
Lu & Scholdt, 2016	single item	should do	general	N	1		to what extent they thought the government should take actions to address climate	N	Likert scale		11 ?	Y		0 = do nothing at all to 10 = do everything they can	7,7	2,73				
Schleich & Faure, 2017	single item	policy relevance	general	N	1		How important do you consider future international agreements are for combating climate change?	N	Likert scale		5			1 = very unimportant 2 = rather unimportant 3 = neither important nor unimportant 4 = rather important 5 = very important		USA Germany	0,73 0,87			
Ziegler, 2017	single item	WTP	general	N	2		Would you agree to additional climate protection measures being financed by the national budget? Would you be willing to pay higher prices for everyday products or services that offer a comparable quality or	Y	binary		2			yes/no						
Baranzini & Carattini, 2017	single item	acceptability	specific	N	3		In spite of drawbacks, is the implementation of such tax/contribution acceptable? If the revenues from the CO2 tax/climate contribution were to be used as you indicate in the questions 16 and 17 If in 6 months from now you were asked to vote on a CO2 tax/climate contribution, what is the price increase in	Y	binary		2			yes/no						
		WTA						Y	scale		8			Partiality reported.						
Dreyer, Teisl, & McCoy, 2015	composite acceptance:	acceptability in favor-against agree-disagree	specific	Y	4	0.91	How acceptable do you find the fuel economy standards To what extent are you in favor for or against the fuel economy standards To what extent do you agree or disagree with the fuel economy standards	not clear	Likert scale		5 N	Y				86,1		13,9	165	
Dreyer, Teisl, & McCoy, 2015	support:	prefer having to not supportive WTA			7	0.84	Do you prefer having the fuel economy standards in place, as opposed to no fuel economy standards How supportive are you of the fuel economy standards How willing are you to bear some of the costs resulting from the fuel economy standards How willing are you to take action to voice a positive opinion about the fuel economy standards, such as writing a letter or calling a representative In regards to the fuel economy standards, how likely are you to: – Voice a positive opinion to a family member – Express a positive opinion on social media, such as Facebook – Voice a positive opinion to a co-worker – Write a positive opinion letter to a newspaper									66,1		33,9		
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				
Dreyer & Walker, 2013	single item	acceptability	specific	N	2															
Dreyer & Walker, 2013																				

Table 43: *continued*

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Chaudoin, Smith, & Urpelainen, 2013	single item	good-bad idea	general	N	7		"As you may know there is some discussion about whether or not it is a good idea for nations to work together to establish legally binding agreements, such as treaties, to address certain international problems.	N	binary				1 = good idea, 0 = not a good idea			68					
		should do					"Based on what you know, do you think the U.S. should or should not participate in the following treaties and agreements: A new international treaty to address climate change by reducing green house gas emissions?	N	binary		2 ?	N	1 = should participate, 0 = otherwise			80					
							Some people say that the world is facing some new problems that require some new international institutions or agencies to deal with them. Do you think that there should or should not be new international institutions to monitor whether countries are meeting their treaty obligations to limit their greenhouse gas emissions that contribute to climate change?	N	binary				1 = should participate, 0 = otherwise			62					
							Which comes closer to your opinion: (a) Efforts in the United States to reduce the release of greenhouse gasses will cost too much money and hurt the U.S. economy or (b) The U.S. economy will be more competitive because these efforts will result in more efficient energy use, saving money in the long run?			(a) Efforts in the United States to reduce the release of greenhouse gasses will cost too much money and hurt the U.S. economy or (b) The U.S. economy will be more competitive because these efforts will result in more efficient energy use, saving money in the long run?											
		opinion					"Creating tax incentives to encourage the development and use of alternative energy sources, such as solar or wind power"	Y	binary							73					
		support-oppose						Y						strongly support, somewhat suport ...			83				
							"Requiring auto-makers to increase fuel efficiency, even if this means the price of cars would go up	Y									70				
						Raising taxes on fuels such as coal and oil to encourage individuals and businesses to use less.	Y									35					
Jagers & Hammar, 2009	single item	good-bad suggestion	specific	N	5		Increase CO2 tax on petrol Increase vehicle taxes for cars with large engines Increase information on traffic's effect on climate change Expand public transport Decrease tax on fuel that does not affect the climate	Y	Likert scale	5	Y	Y	very good suggestion, rather good suggestion, neither good nor bad suggestion, rather bad suggestion, very bad suggestion	No Opinion		6	4	15	26	23	25
																4	13	31	27	12	12
																4	30	40	21	3	1
																3	42	36	15	2	1
																4	49	36	8	1	1
		referendum		N	8		Increase the annual vehicle tax Increase the CO2 tax for petrol and diesel Increase enforcement of speed limits Design the annual vehicle tax according to the levels of CO2 emissions of the vehicle Decrease the tax on environmentally adjusted companyowned vehicles Expand public transport Subsidise (support) purchases of environmentally friendly technology Decrease taxes on fuels that do not affect the climate	Y	binary	2	Y	N				8			7	83	2
																20		10	68	2	
																46		14	39	1	
																56		14	28	2	
																74		12	12	2	
Jagers, Lofgren, & Strippel, 2010	single item	choice attitude	specific (hypothetical and existing)	N	3		choice between co2 tax and PCA attitude to carbon tax attitude to an increase in carbon tax attitude to PCA scheme Positive to a PCA scheme (dummy variable 1/0, where 1 is positive and 0 is negative) given that positive to an increase in the carbon tax. Positive to a PCA scheme (dummy variable 1/0, where 1 is positive and 0 is negative) given that negative to an increase in the carbon tax	Y	binary Likert scale	2 ? 4 ?		N N	PCA / CO2 tax 1 = very negative to 4 = very positive	prefer current carbon tax:			66				
																50					
																36					
																0,51				420	
																0,21				419	
Kim, Wolinsky, & Nahmias, 2015	single item	mix	specific	N	8		Taking steps against climate change would increase costs to the average person for energy and other products by [1% GDP per capita] per month. Would you be willing to pay this cost? How about an increase of [0.5% GDP per capita] per month? Global warming is a serious and pressing problem. We should begin taking steps now even if this involves significant costs.		not reported	not reported	?	?	partially reported								
		WTP					Y														
		taking action					Y														
		favour-oppose					Y														
		favour-oppose					Y														
		favour-oppose					Y														
		necessary					N														
		agreement					Y														

Table 43: *continued*

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Jang, 2013	composite	support-oppose	general in policy classes	Y	2	0.81 (correlation)	How much do you oppose or support	N	Likert scale	5 ?		Y	strongly oppose, somewhat oppose, neither oppose nor support,	3,67	1,14				109
						(a) an international policy that protects the environment and prevents further aggravation of climate change						support,	3,43	1,14	112				
						(b) a global treaty such as the Kyoto Protocol that regulates greenhouse gases?						somewhat support, strongly support	3,81	1,14	102				
		agreement	Y	2	0.79 (correlation)	how much they agreed or disagreed with the following two statements:	N	Likert scale	5 ?		Y	1 = strongly disagree to 5 = strongly agree	3,41	1,31				109	
					(a) "we (U.S.) should immediately increase government regulation on industries and businesses that produce a great deal of greenhouse emissions,"							3,09	1,35						
(b) "we (U.S.) should immediately increase taxes on industries and businesses that produce a great deal of greenhouse emissions,"											3,6	1,28				112			
Kachi. Bernauer, & Gampfer, 2015	composite	mix	general											0,69	0,25				Germ any
		should do		Y		0.84 (Germany)	People hold different views about whether policy-makers should give priority to measures against global warming, even if such measures have a negative effect on the economy. What is your view?	N	binary	2	Y	N	1 = should give priority, 2 = Should not give priority, 3 = Don't know	0,55	0,39				1087
		is doing				0.96 (USA)	To deal with global warming, do you think the government of the United States is doing ...	N	ordinal	3	Y	Y	1 = too much, 2 = about the right amount, 3 = not enough						US
		favour-oppose					Do you favor or oppose preserving or expanding forested areas, even if this means less land for agriculture or construction?	N	Likert scale	4	Y	N	1 = favor strongly, 2 = favor somewhat, 3 = oppose somewhat, 4 = pppose strongly	Country specific means reported. Not reported here.					944
		favour-oppose					Do you favor or oppose increasing the requirements for fuel efficiency of automobiles, even if this raises the cost of cars and bus fares?	N	Likert scale	4	Y	N	1 = favor strongly, 2 = favor somewhat, 3 = oppose somewhat, 4 = pppose strongly						
		WTP						Imagine that taking effective steps against global warming would increase energy costs to the average household in the United States by 20 dollars per month. Would you be willing or not be willing to pay this additional cost as part of taking steps against global warming?	Y	binary	2	Y	N		1 = would be willing, 2 = would not be willing				
Schmocker & Petterson, 2012	composite	WTA	specific	Y	2	0.86 (UK)	<i>The UK government has decided to introduce an environmental tax of £50 per month to be paid by all UK residents including all university students. The decision was made after a long debate with several economists and scientists through which the government got convinced that this additional tax is needed to influence greenhouse emissions. The tax will be used for environmental research and to subsidise the introduction of new technology that emits less CO2. The government accounted that they justified the amount by scientific research referring to the carbon footprints.</i>	Y	Likert scale	7 ?		Y	not reported						
						0.91 (Japan)	Are you willing to accept this governmental decision for an environmental tax? Do you support this governmental decision for an environmental tax?						3,06	1,75				3,22	1,62
Lofgren & Nordblom, 2009	single item	relative amount	specific	N	1		Do you think the tax should be increased or decreased?	Y	Likert scale	6									119
McCrigh et al., 2015	composite	relative amount	general	Y	3		The European Union has the objective of reducing its greenhouse gas emissions by at least 20% by 2020 In order to limit the impact of climate change, the European Union is also proposing an international agreement The European Union has the objective of increasing the share of renewable energy to 20% by 2020. Thinking	N	three	3			1 = too ambitious to 3 = too modest						
Allen & Chatterton, 2013	experiment	choice	specific	N	-		slider with options		demand and supply measures selection										
Hurlstone et al., 2014	indication	emission cuts	general	N	1		Starting from an emission cut of 0%, participants were required to adjust the emission cut displayed in the graphical interface to a level that they would be willing to accept to reduce the risk of climate change.	Y	amount of emission cut in %										19% to 32% emission reductions
Bechtel & Scheve, 2013	single item	referendum	specific	N	8		If you could vote on each of these agreements in a referendum, how likely is it that you would vote in favor or against each of the agreements? Please give your answer on the following scale from definitely against (1) to definitely in favor (10).	Y	Likert scale	10			vote definitely against to vote definitely in favor						

Table 43: *continued*

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Bernauer & McGrath, 2016	composite		general	Y				N	Likert scale										
		favour-oppose			3	0.77	Do you favor or oppose preserving or expanding forested areas, even if this means less land for agriculture or construction? Do you favor or oppose increasing the requirements for fuel efficiency of automobiles, even if this raises the cost of cars and bus fares?			4			favor strongly, favor somewhat, oppose somewhat, oppose strongly						1502
										4			too much, about right amount, not enough						
		relative					To deal with global warming, do you think the government of the U.S. is doing ...			3									
					4	0.67	If I had to reduce my energy consumption and carbon dioxide emissions this would reduce my quality of life too much.			4			strongly agree, mostly agree, mostly disagree, strongly disagree						1663
		behavioural change intentions					If I avoid activities that emit carbon dioxide I contribute to solving the problem of global warming I prefer to enjoy life without having to worry about how much energy I consume and how much carbon dioxide I emit												
							Imagine you are buying a new car and you have to choose between a larger, more powerful car that consumes more fuel, and a smaller and less powerful car that consumes less fuel. Assume that this will be the only car you own, and that both cars cost exactly the same. Which car would you buy?			2			larger, more powerful car consuming more fuel / smaller, less powerful car consuming less fuel						
					7	0.95	Sign a petition in support of actions against global warming?												1663
							Join or renew membership of an environmental group that demands stronger policies against global warming? Read a newsletter, magazine or other publication written by an environmental group that demands stronger policies against global warming? Write a letter or call your member of Parliament or another government official to support stronger policies against global warming? Write to a newspaper in support of stronger policies against global warming? If a local, state or Federal election was called, vote for a candidate at least in part because he or she was in favor of stronger policies against global warming?			7			not at all likely to very likely						
		citizenship intentions																	
Give money to an environmental group that supports stronger policies against global warming?																			